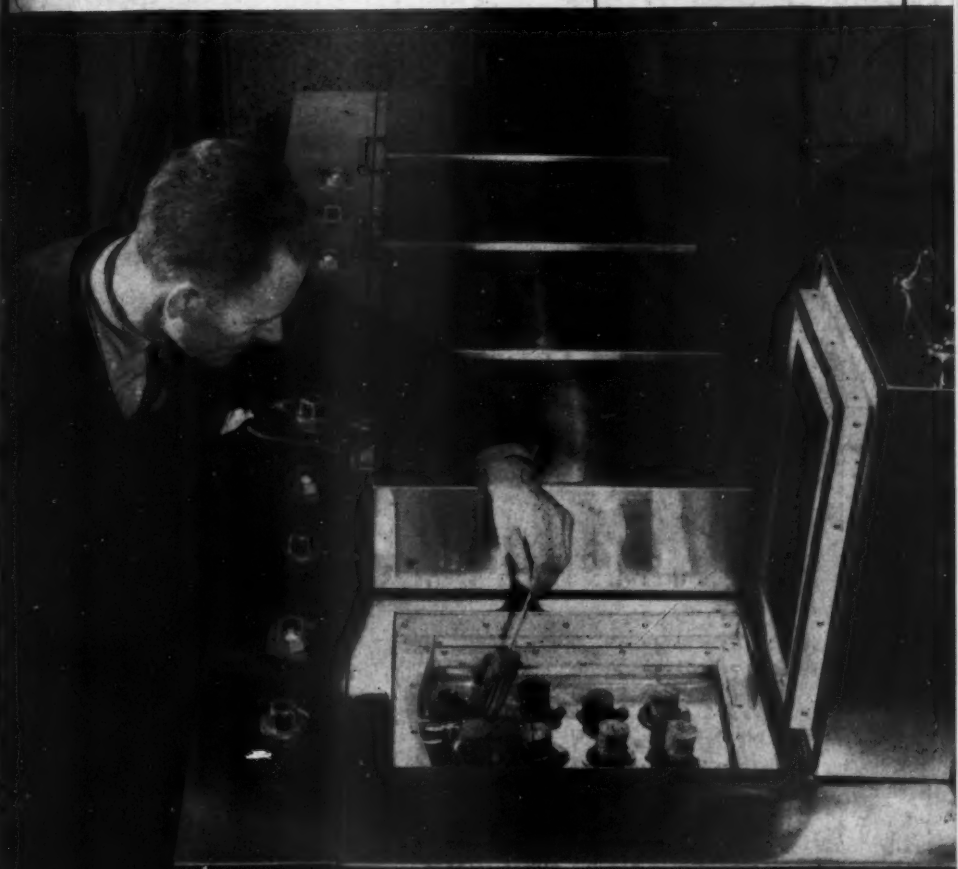
Refrigeration Service Engineer

VOL. 15 NO. 10 ★ ★ ★ OCTOBER · 1947



20 New— CHICAGO VALVE PLATES

CS No.	COMPRESSOR
540	APEX
725	BRUNNER Models: S-140, R330
726	BRUNNER Model: R500
728	COPELAND Model: 21
509	FAIRBANKS-MORSE Models: BS6, B-8
509	GALE
560	GALE
509	JOMOCO Models: RC6 1/5 H.P.
560	JOMOCO Models: RC5 1/6 H.P.
730	KELVINATOR Model: K
731	KELVINATOR Model: Y
735	M & E
724	PAR Models: 25, 50
509	STEWART-WARNER Models: 1934 to 1938 inclusive
720	SUPERCOLD Model: E
732	UNIVERSAL Models: K, L, M
566	WILLIAMS Models: C75, H
567	WILLIAMS Models: D100, F150, V200, V300
568	WILLIAMS Model: A
565	YORK Model: LG-2

FOR BETTER PERFORMANCE

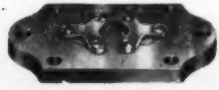
These 20 New Valve Plates are Designed to Fit 37 Compressor Models. This Greatly Increases the Scope of Your Service on Compressor Repairs.

ASK FOR THEM AT YOUR REFRIGERATION WHOLESALER

PERFECT BALANCE

Chicago Seals
MODERN DESIGN

REPLACEABLE SEATS ARE EXCLUSIVE WITH CHICAGO VALVE PLATES



CHICAGO SEAL CO. 20 N. WACKER DR., CHICAGO 6, ILL.

THE REFRIGERATION SERVICE ENGINEER, Nickerson & Collins Co., Publishers, 435 N. Waller Ave., Chicago 44, Ill. Published monthly, Vol. 15, No. 10, October, 1947. Entered as second class matter March 4, 1938, Chicago, Ill., under the Act of March 3, 1879. Subscription in the United States, $2.00 per year; all other countries, $3.00 per year.

Technical Service

Since 1915, the name ANSUL has become well known in the refrigeration field, not only as a producer of high grade refrigerants but, also, as a reliable source of authentic, up-to-the-minute technical information.

Over this span of years ANSUL RESEARCH has accumulated volumes of data and made extensive studies in many phases of refrigeration, especially those associated with the chemical aspects of refrigerants, oils, etc. This has resulted in the compilation of an ANSUL library of technical knowledge invaluable in the solution of refrigeration problems.

ANSUL Technical Service is available to Refrigeration Engineers everywhere through ANSUL'S universal wholesale organization. Your ANSUL wholesaler welcomes you to make full use of it without cost or obligation.

Take your refrigeration problems which arise from time to time in the operation of refrigeration systems to your ANSUL wholesaler. He probably has the ANSUL technical bulletin which will give you the answers to your questions. If not, he will be glad to get the information for you from ANSUL RESEARCH. He wants to make your job easier and more profitable.

1 BULLETIN ON SLUDGES
Data on the origin, composition, distribution and general properties of Sludges.

2 BULLETIN ON SEPARATION OF WAX FROM OIL-REFRIGERANT MIXTURES
Information on the effect of temperature, concentration and types of oils on Wax formation in Oil-Refrigerant Mixtures.

3 BULLETIN ON MOISTURE AND DRYING METHODS
A compilation of proved methods of Handling Moisture in Refrigeration Systems.

4 BULLETIN ON REFRIGERANT DRIERS
A thorough study of the efficiency of the more common refrigerant driers in addition to data on Corrosion Limits of water-refrigerant mixtures.

5 BULLETIN ON KEEPING SERVICE CYLINDERS CLEAN
Outlines methods of Cleaning and Drying Service and other Cylinders. Explains why overfilling cylinders is dangerous.

6 BULLETIN ON ALUMINUM AND METHYL CHLORIDE
Gives the reasons for the complete elimination of aluminum in Refrigerating Systems charged with methyl chloride.

LIQUID Methyl Chloride by ANSUL*

ANSUL REFRIGERANTS—SULFUR DIOXIDE, METHYL CHLORIDE, KINETIC'S "FREONS," AND METHYLENE CHLORIDE—ARE AVAILABLE AT LEADING ANSUL WHOLESALERS EVERYWHERE.

LIQUID Sulfur Dioxide by ANSUL*

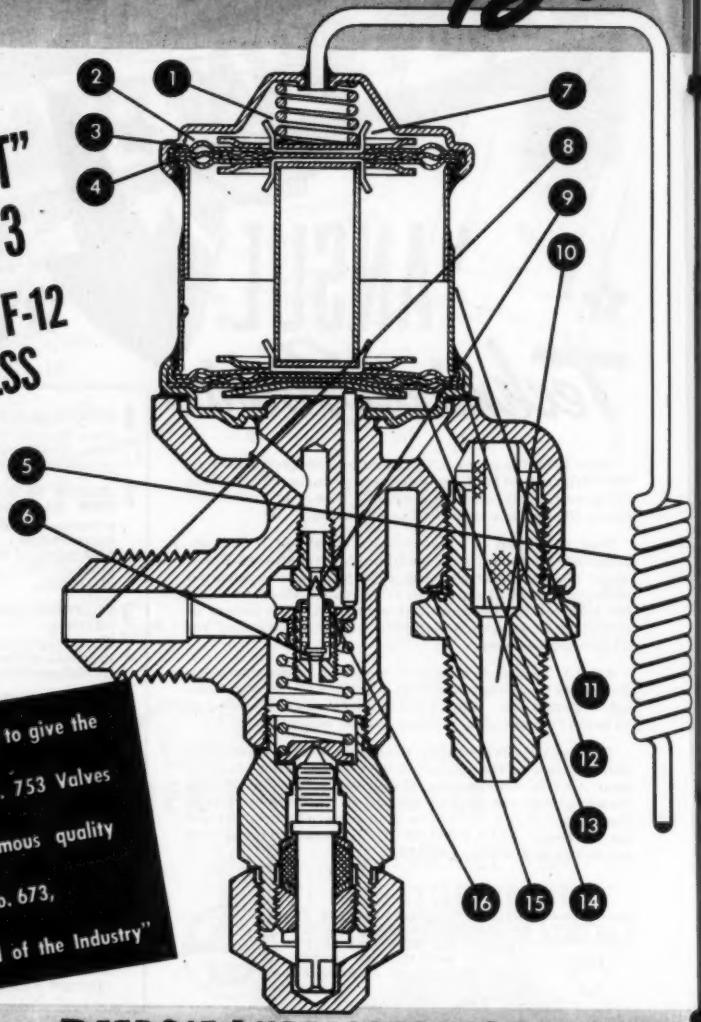
*REG. U. S PAT. OFF

ANSUL CHEMICAL COMPANY
REFRIGERATION DIVISION, MARINETTE, WISCONSIN
DISTRIBUTORS FOR KINETIC'S "FREON-11" "FREON-12" "FREON-21" "FREON-22" AND "FREON-113"

Let's Analyze

"DETROIT" NO. 573

½ TON F-12 OR LESS



They all add up to give the "DETROIT" No. 753 Valves the same famous quality as No. 673, The "Standard of the Industry"

"DETROIT"

DETROIT LUBRICATOR COMPANY

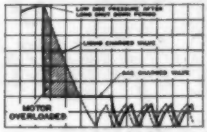
General Offices: 5900 TRUMBULL AVENUE, DETROIT 8, MICH.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

Quality

These Add up to Perfect Refrigerant Control

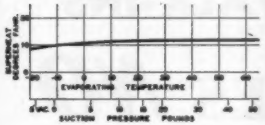
1. GAS CHARGED FOR MOTOR PROTECTION



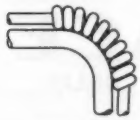
2. DIAPHRAGM BACKED UP (LEAF SPRING EFFECT) FOR LONG LIFE

3. DIAPHRAGM MOVEMENT CONTROLLED FOR QUICK RESPONSE

4. DIAPHRAGM AREAS CONTROLLED FOR CONSTANT SUPERHEAT



5. FLEXIBLE COILED FEELER BULB MAY BE SHAPED TO FIT SUCTION LINE



6. SWIVEL TYPE NEEDLE

These Add up to Flexibility of Installation

7. GAS CHARGED POWER ELEMENT FOR HIGH AND LOW TEMPERATURE
8. SINGLE OUTLET SUITABLE FOR ⅜" OR ½" TUBE
9. ONE ORIFICE FOR CAPACITIES UP TO ½-TON FREON-12
10. ONE INLET FOR ¼" OR ⅜" TUBE

These Add up to Customer Protection

11. HERMETICALLY SEALED SPACER
12. ROLLED JOINTS
13. STAINLESS STEEL DIAPHRAGMS
14. STRAINER
15. GASKET AT INLET
16. DELUBALOY NEEDLE AND SEAT

2830

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Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LTD., MONTREAL, TORONTO, WINNIPEG

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THE NEW

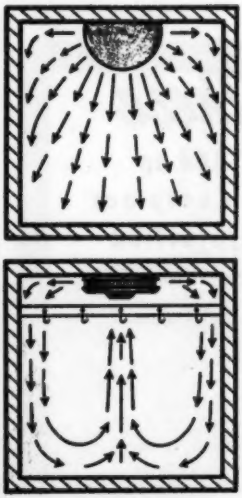
Filterpure

HALF ROUND

COOLING UNIT

with Air Purification

FOR **WALK-INS**



TAKES *NO* STORAGE SPACE

FROM A COOLER

Sold by Leading Refrigeration Wholesalers

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WHEN YOU RECHARGE

with Virginia SO_2

If you value your time, you should value Virginia "Extra Dry Esotoo," the sulfur dioxide that is consistently pure. When you recharge with "Esotoo," you take the first step in eliminating costly and time-consuming call-backs. Every cylinder is triple-tested to make certain that no dirty, oily or wet product will be shipped—reasons enough why "Esotoo" maintains its international reputation for high quality and dependability. VIRGINIA SMELTING COMPANY, West Norfolk, Va. *Established 1898.*

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Buy from Your Wholesaler

Distributors for
Kinetic's "Freon" Refrigerants

VIRGINIA *Refrigerants*

WEST NORFOLK • NEW YORK • BOSTON • DETROIT

RECORDED
PROOF OF PERFORMANCE

TEMPERATURE RECORDER

Standard Ranges
24 Hour Chart Rotation

—20° to +40°F.
—10° to +50°F.
30° to 60°F.
40° to 100°F.
70° to 130°F.

TEMPSCRIBE Recorders have many applications of practical value to stimulate sales of new appliances, promote customers' good will, and build profitable service business.

TEMPSCRIBE Recorders do what indicating instruments can't do—they give a 24-hour record of temperature and motor on-and-off time. There is no waste of time watching thermometer readings or clocking motor operation. Just leave your TEMPSCRIBE Recorders on the job for a time while you handle some other work.

TEMPSCRIBE charts—made before and after servicing—are tangible proof of an installation or service job well done. If the charts indicate that a complaint is due to abnormal use or improper location of the appliance, you have indisputable evidence on hand to explain the situation to the housewife, storekeeper, or plant operator.

In the show room, TEMPSCRIBE charts convincingly prove that temperatures in freeze chest and storage space are maintained within the desired range even at high room temperature.

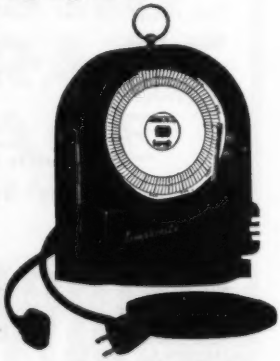
TEMPSCRIBE Recorders may be used on practically any household and commercial refrigeration unit, such as dual-temperature refrigerators, home and farm refrigerators, refrigerated display cases, reach-in freezers, walk-in coolers, ice cream cabinets, frozen food cabinets, and refrigerating equipment used in food freezing plants and locker plants.

Convertible to Motor Operation Recorder, or Different Temperature Range, Simply by Changing Door

Any TEMPSCRIBE can be quickly converted to a different temperature range, or to a time-operation recorder, by replacement of the door that forms the front of the recorder. Door removal simply requires lifting out the hinge pin.

The pen of the Operation Recorder is actuated by an electro-magnetic armature, made for either series connection (plug-in connections shown at right) or for parallel connection. Either type has voltage range up to 250 volts, amperage range up to 20 amperes.

For refrigeration shop and service work a widely used TEMPSCRIBE combination comprises one clock case with spring-wound clock for 24-hour chart rotation and two doors (one with —20° to +40°F. temperature element, and one with mechanism for recording motor on-and-off time).



RECORDER for MOTOR OPERATION

Ask your jobber about TEMPSCRIBE, or write for Bulletin 731

BACHARACH INDUSTRIAL INSTRUMENT CO.
7000 BENNETT STREET • PITTSBURGH 8, PA.

Logan A name to remember when you think of **better** lathes and shapers

NO ADVANCE IN PRICES

During war years, prices in general advanced more than 40%. During same period, Logan Lathe prices averaged approximately 15% increase, in spite of improvements in design and construction. Our enlarged plant, equipped with most modern machinery makes for production savings which are passed on to users of Logan Lathes. That is why even with recent material and labor cost increases, Logan Lathe prices remain unchanged.

Logan Lathe prices start at $159.50

LOGAN LATHES SAVE MONEY

Price naturally, has a bearing on the lathe you buy. Yet the low Logan price tag is only a one-shot saving. It is multiple, on-the-job savings, as well as price that makes Logan the lathe of true economy.

LOGAN 7" SHAPER

Logan on-the-job economies result from the way the Logan Lathe is designed and built. For example, due to its ball bearing spindle mounting, the Logan Lathe is ready for any operating speed from 30 to 1450 rpm, with no bearing adjustment. V and flat bed ways are machined to within .0005" of parallelism. Headstock bearing faces are held to an accuracy of .0005". Rugged, massive construction is combined with this accuracy, and vital wear points are protected by self lubricating bronze bearings. Consequently, even after years of constant use, a Logan Lathe retains power for heavy cuts, speed for low cost parts production, and accuracy for exacting tool room work. In many plants, batteries of Logan Lathes handle all medium and small work, saving in power costs, set-up time, and reduced rejects. In any shop, large or small, Logan sustained accuracy and versatility save time, materials, labor and money. See the complete line of Logan Lathes and Shapers at your near-by Logan dealer's, or write direct for catalog information. AA-2

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For YOUR
Refrigeration Needs
Artic
DU PONT
METHYL
CHLORIDE

99.5% Pure · Dry · Uniform

HIGH-PURITY Du Pont "Artic" Methyl Chloride is designed to meet your refrigeration needs.

ORDER NOW! It's available as you need it from wholesalers' stocks in principal cities.

EMPTY CYLINDERS NEEDED—Return them promptly to assure rapid deliveries.

For technical information, write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

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DU PONT
METHYL CHLORIDE
SPECIFICATIONS

Purity	99.5% Methyl Chloride
Moisture	0.008% by wgt. max.
Acid as (HCl)	0.001% by wgt. max.
Residue on Evaporation	0.01% by wgt. max.
Boiling Range (760mm)	−24.6° to −23.6°C.
Color	water white, clear

DU PONT
ELECTROCHEMICALS

DU PONT

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

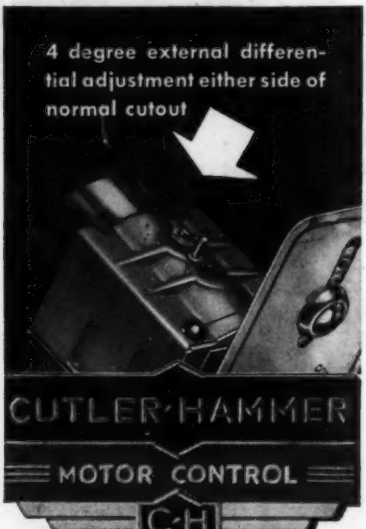
A COMPREHENSIVE LINE

Cutler-Hammer Refrigeration Replacement Control

The Cutler-Hammer line of Refrigeration Replacement Control is unusually comprehensive and complete. One unit alone, the *Universal* unit, will handle 60% of the repairman's needs. In rare cases where exact replacement control must be furnished, that item also will be found in the Cutler-Hammer line, individually packed, clearly labelled, complete with dial plate, mounting screws, trim washers and instructions for mounting, and range and differential adjustments.

The Cutler-Hammer Line of Refrigeration Replacement Controls is the product of more than 50 years of fundamental control specialization . . . another reason why outstanding refrigeration wholesalers recommend it and alert service organizations from coast to coast feature and use it. . . .

CUTLER-HAMMER, Inc., 1363 St. Paul Ave., Milwaukee 1, Wis.



This One Universal unit alone covers 60% of all needs.

Bul. 9521N9

Adjustable Mounting Brackets
Maximum Mounting Centers 4-3/16
Minimum Mounting Centers 2-3/16

Adjustable Cutout Feature—Differential can be increased 4 degrees by turning indicator in "Hi" direction and decreased 4 degrees by turning in "Lo" direction.

Adjustable Range—Turning screw clockwise lowers settings and counter-clockwise raises settings.

Operating knob can be adjusted to meet various evaporator scale settings. New knob is ideal for varying shield thicknesses. Makes *this* control adaptable to wider range of single dial replacement jobs where overload is not required in unit.

DOMESTIC, SEMI-COMMERCIAL AND COMMERCIAL CONTROL

IMPERIAL TRIPLE-SEAL FLARE FITTING

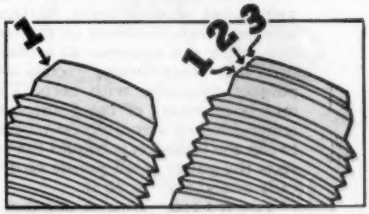
the BETTER fitting for refrigeration work . . . . . .

or extra protection against leakage the Imperial riple-Seal Flare Fitting has a groove in the seat hich brings you triple-seal tightness in every oint.

Here is how it works. When the flare is drawn gainst the groove, the copper tubing is extruded to the groove making a tight, self-sealing joint. his joint will remain leakproof even though the ce of the seat may be nicked or marred. This riple-Seal feature is included on all sizes ⅜" d larger.

Extra length pipe threads on pipe connections rovide new further protection against leakage . these threads are longer than formerly on sizes " and over, and conform to the latest SAE ndards. This extra length is especially valuable here reconnection is necessary as it provides for ditional take-up.

Today, more than ever before, the Imperial iamond "I" on fittings is your assurance of top uality.



(Left) Ordinary flare fittings have only one seal.

(Right) Imperial Triple-Seal Flare Fittings have three seals to give you new, extra protection against leakage.

THE IMPERIAL BRASS MFG. CO.
534 S. Racine Ave., Chicago 7, Ill.

IMPERIAL

FITTINGS • VALVES • DRIERS
FILTERS • FLOATS • CHARGING
LINES • TOOLS FOR CUTTING,
FLARING, BENDING, PINCH-OFF,
SWEDGING, REFACING

"MAKE MINE THE GAUGE WITH THE RECALIBRATOR"...

That's the final verdict of refrigeration men who know their gauges and dial thermometers. They look upon the Marsh "Recalibrator" as a feature that makes a better instrument still better.

There is a good, solid reason for this: Every refrigeration man knows how difficult it is to avoid knocking gauges out of adjustment, particularly test gauges that receive rough handling in the tool kit and on the job. But when this happens to a Marsh gauge, you simply turn the "Recalibrator" screw as illustrated until the pointer coincides with zero. This, remember, is not merely re-setting of the pointer, for the "Recalibrator" is designed to actually re-establish the relationship between the bourdon tube and the movement. Thus it corrects the gauge at all points on the dial—the only basically sound way to do it.

Yes, it's reassuring to use these instruments that are so easy to keep on the beam. All are available with the "Recalibrator". Ask for handy booklet covering gauges and thermometers for refrigeration service.

JAS. P. MARSH CORP., 2057 Southport Ave., Chicago 14, Ill.
Export Department: 155 East 44th St., New York 17, N. Y.

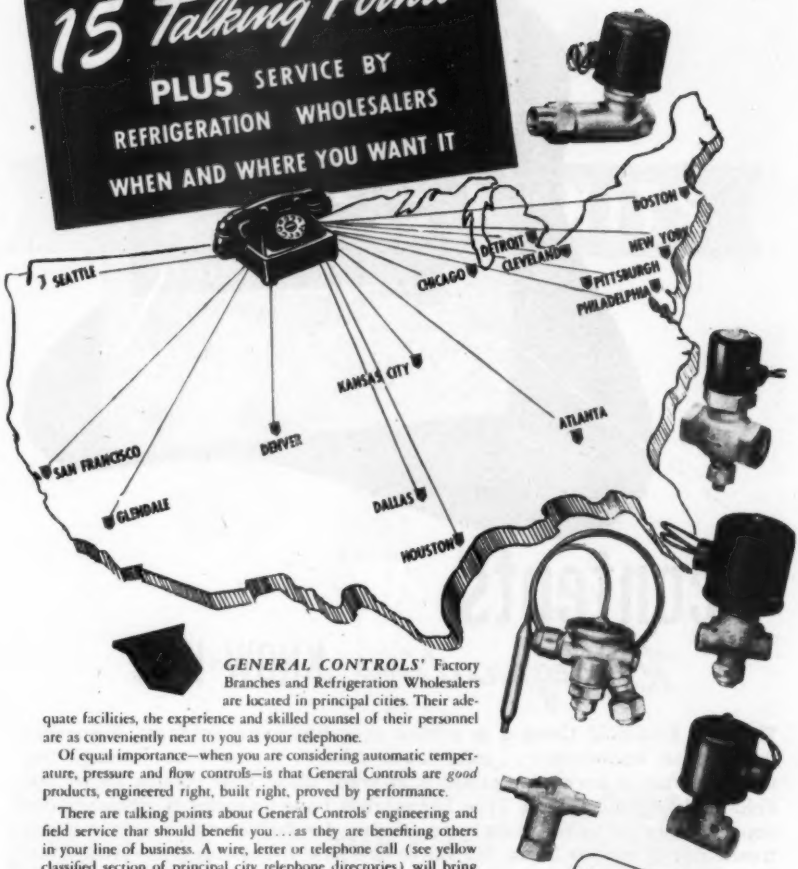
Marsh Refrigeration Gauge —made in pressure, compound, and ammonia types.

Marsh Serviceman—remote reading service thermometer —now available in range —30°F. to +65°F. for work on quick-freeze units.

MARSH *Refrigeration Instruments*

15 Talking Points

PLUS SERVICE BY
REFRIGERATION WHOLESALERS
WHEN AND WHERE YOU WANT IT



GENERAL CONTROLS' Factory Branches and Refrigeration Wholesalers are located in principal cities. Their adequate facilities, the experience and skilled counsel of their personnel are as conveniently near to you as your telephone.

Of equal importance—when you are considering automatic temperature, pressure and flow controls—is that General Controls are *good* products, engineered right, built right, proved by performance.

There are talking points about General Controls' engineering and field service that should benefit you . . . as they are benefiting others in your line of business. A wire, letter or telephone call (see yellow classified section of principal city telephone directories) will bring a qualified Controls Engineer to your office.

FOR COMPLETE Specifications request new Catalog 52-C

34-1

contents

Refrigeration KNOW-HOW

The new Kold-Hold Catalog is a book of benefits and savings. It contains refrigeration know-how . . . information relative to the better storage and transportation of perishable products at lower costs. This catalog shows that Kold-Hold Serpentine Plate Type Evaporators have no equal in efficiency and dependability for locker plant space cooling, for shelves and stands in sharp-freezing or as cabinet liners, shelves or dividers. It explains how "Hold-Over" Plate Type Evaporators maintain the temperature of delivery bodies at the uniform level necessary in the successful transportation of fresh meat, ice cream, frozen foods and other perishables.

If you are interested in better storage and transportation of your products, write for this new free book of refrigeration knowledge today.

KOLD-HOLD

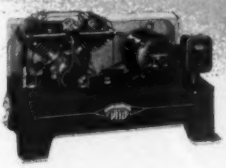
KOLD-HOLD MANUFACTURING COMPANY
502 E. HAZEL STREET LANSING 4, MICHIGAN

PAR

CONDENSING UNITS

Par-Condensing Unit Line sold exclusively through Franchised Refrigeration Equipment Wholesalers!

In sizes from 1/6 to 5 H.P. . . . air- and water-cooled models . . . ask your Par Wholesaler for details or write for Par Catalog R-97.



Tops in PERFORMANCE ECONOMY and EFFICIENCY.

. . . By Comparison — You'll Buy PAR

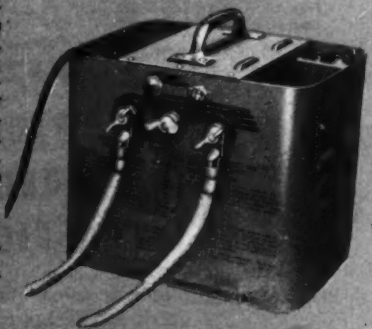
Lynch Manufacturing Corporation

General Offices, Toledo 1 • Factory, Defiance, Ohio, U.S.A.

Here's the easier, safer way to do soldering on repair and service jobs

IDEAL "THERMO-GRIP" Soldering Set

This is the new and improved unit to use for brazing and all soldering jobs such as sweating and unsweating threadless copper pipes and fittings, soldering lugs and terminals, etc. The Ideal "Thermo-Grip" is light weight, compact, portable, and economical. Operates on resistance heating principle....*faster*—heats 1¼" copper pipe to soldering temperature in less than a minute . . . *safer*—all parts fully insulated; no fire hazard . . . *easier*—handy thumb switch permits close heat control. Draws current only when in use. Write today for full information.



IDEAL INDUSTRIES, INC.
Successor to Ideal Commutator Dresser Co.
1093 PARK AVE. SYCAMORE, ILL.

IDEAL

ATTACHMENTS FOR ALL TYPES OF SOLDERING
"*Plier*" Attachment for soldering work that can be held in jaws . . . "*Pencil*" Attachment for spot or seam soldering . . . "*Fork*" Attachment for soldering in restricted places.

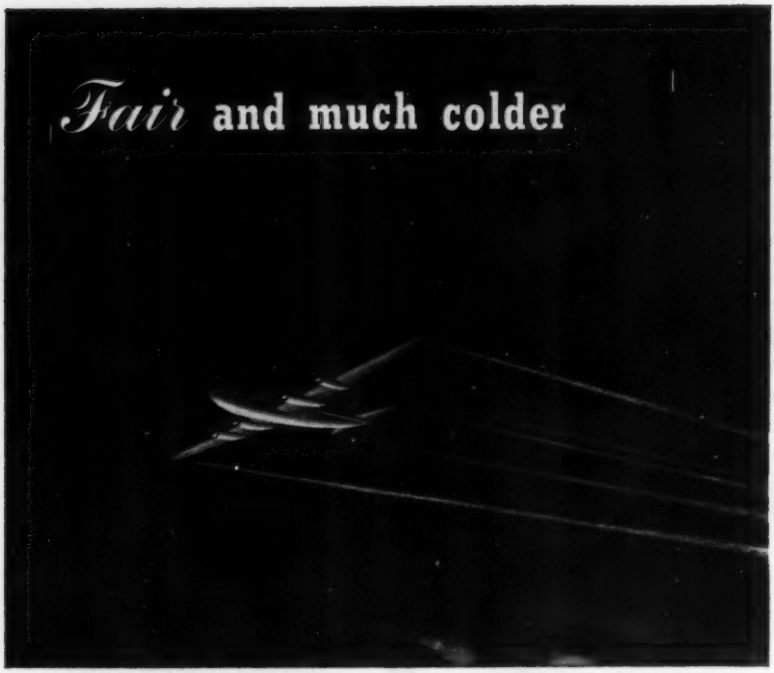
Distributed Through AMERICA'S LEADING WHOLESALERS

The Grand Canyon of the Colorado River, in northern Arizona, is the greatest canyon on earth—200 miles long, eight to ten miles wide, more than a mile deep in many places. The bared rocks, in their riot of reds, buffs, greens, and white, represent geologic time from the oldest known to the present day. Discovered by Cardenas in 1541, it has been a National Park since 1919, a tourist magnet of great importance—and rightly called "the most sublime spectacle in the world."

* *A favorite adjective employed by users to describe their Mills Condensing Units.*

Mills Condensing Units

Mills Industries, Incorporated
4100 Fullerton Ave., Chicago 39, Ill.



The stratosphere plane flies "above the weather" . . . miles above the earth, in a cloudless sky, where the air is thin and bitter cold. Every opening in the cabin must be sealed, to maintain living pressure and temperature within.

Not so vital, but certainly very important, is the proper sealing of openings in refrigerated spaces. Jamison Cold Storage Doors are dedicated to this job, and for half a century they have been doing it to the entire satisfaction of countless users, the world over. Jamison has played an important part in the development of modern cold storage and refrigeration practice.

This vast experience is reflected in today's Jamison line . . . standard Jamison, Stevenson, Victor, and NoEqual Doors, and related products. With so much at stake in the way of maintenance and operating costs, as well as risk to stored merchandise, it is wise to insist on Jamison quality. For full information concerning Jamison-built Doors to suit your particular needs ... and address of nearest branch . . . write the Jamison Cold Storage Door Company, Hagerstown, Maryland.

Branches in Principal Cities, Coast to Coast

JAMISON
COLD STORAGE DOORS

● You'll marvel at the ease and speed with which the PEERLESS Gun Cooler is installed and your customers will marvel at the instant response and unfailing performance of this compact cooler. It is literally a power plant of refrigeration—all in one package. Installation is accomplished by means of very simple exposed hangers, easily accessible. Install it on the wall in Reach-In or Walk-In Refrigerators, Back Bars, etc.

● The Gun Cooler employs "upside-down" refrigeration — a "FIRST" conceived by PEERLESS. Warm air is drawn into the grill at top of cooler, is chilled to the required degree, and poured gently out the bottom. It absorbs heat from stored products as it rises to be rechilled by the Gun Cooler. Simple, but effective! PEERLESS Gun Coolers are quick, sound, and satisfactory answers to many a refrigeration problem.

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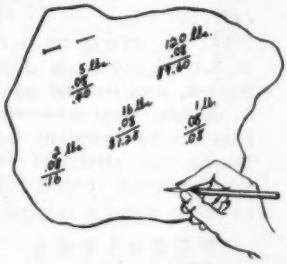

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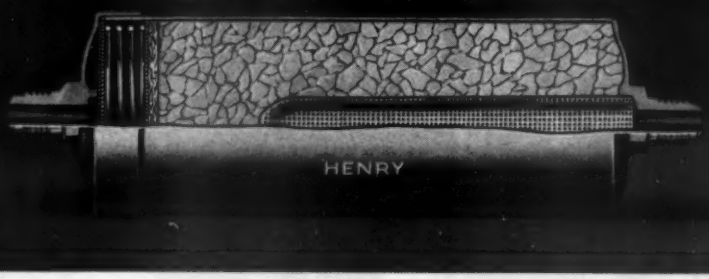

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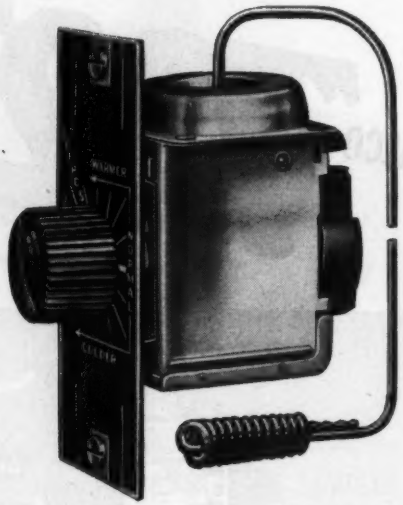

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Only Half a Gram per Cylinder!

(Less Than 10 Parts in a Million)

Inset above shows half a gram of water in eye dropper . . . the moisture content of a 145-lb. cylinder of "Freon-12."

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IN THIS ISSUE

AN increased interest in skating rinks, curling rinks and sports arenas in the United States has resulted in many requests for information on how to construct and maintain artificial ice skating surfaces. A great amount of care and good engineering must be put into the planning of this application of refrigeration and the author, Edward Dowis, of the article on page 29 has endeavored to provide a discussion of the principal factors involved. This article, complete in itself, is the first of a series.

THE description of "An inexpensive solution to a darkroom problem" by Stephen Porter Lathrop on page 33, may be of considerable help to you if you should happen to be called on to provide cooling for the developing solutions in a darkroom. Any method of water cooling will usually do, but this article tells how existing equipment was utilized.

THE Admiral Dual-Temp refrigerator employing a primary and secondary refrigeration system as a means of obtaining two different temperatures, incorporates a unique method of controlling the two systems independent of each other. Beginning on page 34 is the first of a series of articles describing the construction and operation of these refrigerators.

TWO and three stage low temperature applications are always interesting refrigerating systems. The system described under the heading "Accuracy of Control Features Sub-Zero Cabinet" on page 38, offers some inetresting suggestions.

WHAT good refrigeration means to restaurant owners in the city of St. Louis is told in the article "Poorly Kept Refrigerators Mean Low Grades" appearing on page 40.

IN HIS series of articles "Take the Guess Out of Estimating," Donald Daly, the author, discusses this month the question of what to do about dealer contracts for service. Should you engage in such contracts and if you do what should the agreement be, in order to assure happy relations in the future? There are many pitfalls in such contracts. They deserve careful consideration.

THE Service Pointers, starting on page 45, contain a definite recommendation on the use of driers in SO_2 systems and some interesting information on the relation of belt sag to length of belts.

CAN cream be cooled over an aerator is the question asked in the Questions and Answers starting on page 50. "No," says the editor, "not successfully."

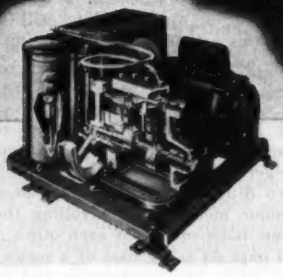
WE ARE again entering the season of conventions and exhibitions and because a crowded condition still exists in hotels, it is time to give thought to which meeting you will attend and where you will stay. See Coming Meetings on page 62 and announcements on the following pages.

COVER

OUR front cover this month shows the sub-zero test cabinet used for cloud and pour testing of petroleum products. Each compartment is individually controlled and operates independent of the others. Temperatures range from plus 80 F. to minus 100 F. Pilot lights in the front of the cabinet light up when the individual compartments call for refrigeration. A complete description is contained on page 38.

Meet the Better Half

Dorotha L. Gossett
J & H Associate,
Refrigeration Division



Jack and Heintz announces an important addition to its line of *better, precision-built* condensing units. The new J & H ½ horsepower model fills the need of the refrigeration industry for a *compact, light-weight* unit for applications requiring more than ⅓ hp. and less than a heavy duty ½ hp.

Better condensing units through

JACK & HEINTZ
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JACK & HEINTZ PRECISION INDUSTRIES, INC., *Cleveland 1, Ohio*

Interior view of the hockey and sports arena in Cleveland, Ohio. One way of producing the checkerboard pattern in the surface of the rink is by painting the pattern with water paint just before the final layer of ice is sprinkled on.

Construction, Operation and Maintenance of

Ice Skating Surfaces

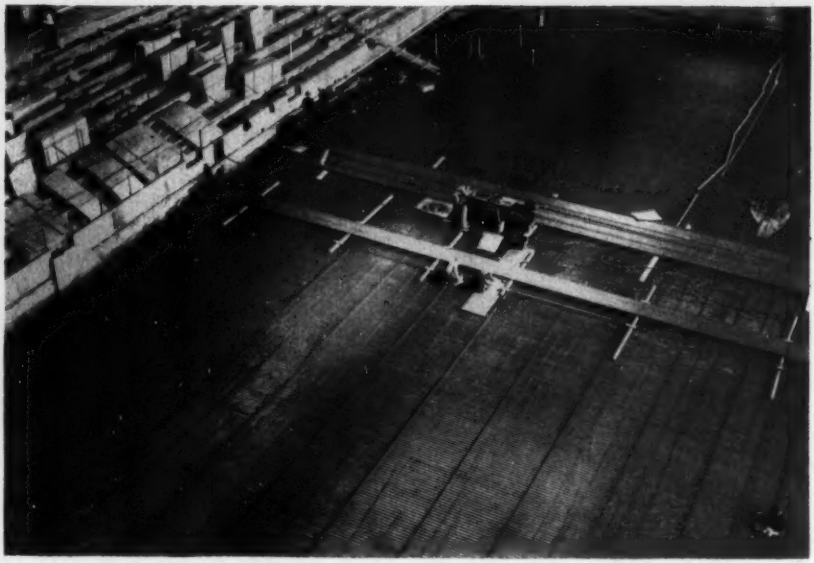
By EDWARD DOWIS

A knowledge of the construction, operational and maintenance characteristics of ice skating rinks is becoming increasingly important to the refrigeration industry. Here is a summary of the information currently available and a prediction of probable developments in the immediate future.

THE use of refrigeration to produce and maintain surfaces for public skating, professional entertainment and ice sports presents problems which differ from other applications. This is true of the design of new installations and the operation, maintainance and alteration of existing equipment. Most of the previously published information on this subject has been descriptive of individual installations and engineering data which is far from being standardized. This lack of standardization is problem number one.

In size, ice rinks vary from a small portable stage, large enough to carry the act of one or two skaters, to floors with a width up to 145 feet or a length up to 280 feet. The mimimum dimensions for playing regulation Ice Hockey are 80x185 feet.

The structural range is from the light portable stage which can be moved to a new location and set in operation quickly and light enough to be transported at low cost, to a permanent structure capable of accommodating a thousand or more skaters, on which ice of desired quality can be frozen within a few hours, and as quickly removed to accommodate other types of exhibition.



Some idea of the large amount of pipe or copper tube required to construct the floor of a refrigerated ice skating rink is gained from this photo of a rink during construction.

Investment may be anything from a few hundred or thousands of dollars to more than a million, including land and building, for an ice arena.

Both direct expansion coils and chilled brine have been used, with copper tubing or steel pipe either submerged in the water to be frozen, installed under metal containers for the water or embedded in the concrete, over which ice is frozen. Even plastic tubing has been considered as a possible heat transfer surface, but it's poor thermal conductivity and rate of expansion with temperature change make it unsuitable. Possibly something more suitable or economical may be developed, but at present steel pipe, plain black if embedded in concrete, galvanized if submerged in water, or copper pipe or tubing seem to be the most suitable materials for cooling coils.

Cooling Coil Construction

Direct expansion coils are preferable for small and portable rinks and may be formed of about ⅝" tubing spaced about 3" center to center. One installation used over 5½ miles of tubing to freeze a surface of over 7000 square feet.

A rink of this type was used during the summer of 1940 in New Orleans. ⅝" type L tubing, spaced 3" on centers was used for the coils. Being installed for temporary use, the ice was frozen in sheet metal pans placed directly over the coils and powered by two 60 hp. condensing units, rated at 37 tons. Freon was used as the refrigerant. The fact that this rink was used in Summer and a semi-tropical climate made this installation unusual, as the usual skating season for public rinks is October 15 to March 15.

Among the factors which favor using the direct expansion coil for freezing the ice are:

1. Lower first cost for entire installation.
2. High efficiency.
3. Minimum weight.
4. Less equipment to install and maintain.

These are important advantages for the direct expansion ice freezing coil and for small portable rinks, or permanent ones where the advantages of the brine system do not outweigh those listed above, the direct system should be used.

Among the advantages of the circulated brine, or indirect system, are:

1. Small leaks are not serious and can be easily repaired or defective sections disconnected from the system.

2. Distribution of chilled brine is more easily controlled.

3. Warm water can be circulated through brine pipes for melting ice.

4. The entire primary refrigerating system can be kept in machinery room. This is necessary in order to comply with some local ordinances.

5. Refrigerants which would not be considered safe in a direct expansion system may be used to chill brine.

6. Some hold over refrigeration can be stored in the chilled brine, to be used while condensing units are idle.

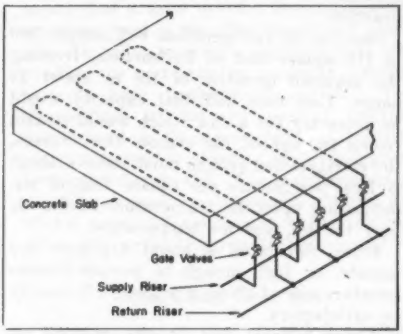


Fig. 1—Hairpin coil connections.

Probably the main reason why chilled brine is used in most large rinks is that leaks, which are almost impossible to prevent entirely, due to expansion and contraction, corrosion, accident, etc. are less serious and more easily repaired in a brine system.

Construction of Brine Coils

Brine coil construction is not standardized but most of them are made of 1¼" pipe, galvanized if submerged in the ice, black steel if embedded in concrete. The spacing is usually 4" center to center, but may be as close as 3" or as far as 6". Pipe are usually laid the width of the rink and connected, at one or both sides, to supply and return headers. The usual method is by the use of the hairpin loop as illustrated in Fig. 1, with 2 headers, supply and return, along one side of the space, or in a trench below the floor. It is important that ample space be available for inspection and repairs, when necessary. There will be considerable movement of the coil ends with change in temperature and nipples should be long enough and so connected to headers, or headers mounted on movable hangars so that movement will be taken up by nipples, elbows, etc. without undue strain on the pipe.

Most of the older rinks were laid directly over the ground, the pipe being fastened to sleepers laid in the sand, or over a concrete floor. In some of these, the pipe coil remained above the floor, which was flooded so as to completely submerge the pipe. This gave good thermal contact between coil and water, and the ice was frozen solid. In others, the pipe was laid in sand or on concrete, and the space between the pipes filled with sand. Over this, a concrete slab was laid, to contain the water to be frozen.

Many of the older rinks do not have insulation beneath the coil, and absorb heat from the earth as it occurs. Obviously this results in costly operation. Most of the more recent installations have insulation between the coil and earth or space beneath, equivalent to 2" to 4" cork. Headers and all brine pipe except that used for cooling surface should be insulated, usually with cork, as should all tanks, heat exchangers, etc. and suction lines to compressors.

Coils in Concrete Slab

Various methods have been used in embedding pipe coils in a concrete slab. At least one such method has been patented. The slab containing the coil should be able to move slightly due to expansion or contraction. This can be accomplished by laying strips of wood or metal over the main floor, or over insulation. Sand can be placed between these strips and the pipe supported on metal frames fastened to them. A concrete slab of 3½" to 3¾" is then poured around the pipe, which should be supported so as to be about in the center of the slab.

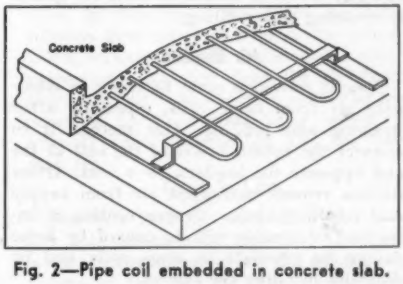


Fig. 2—Pipe coil embedded in concrete slab.

The concrete should be reinforced independently with reinforcing rods running crosswise to the pipe, and probably parallel also, so that the slab will be reinforced independently of the coil.

Special care should be given to having a floor sufficiently level that there will not be a considerable difference in thickness of ice on different parts of the floor as this will result in ice of varying hardness or the use of excess power in order to freeze the thicker sections to the required degree of hardness. As the thickness should be between

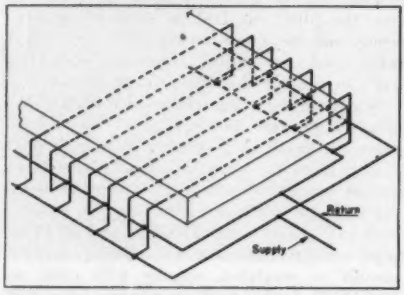


Fig. 3—Piping arrangement for flow in opposite directions with supply and return headers on each side.

¾" to 1½", a large floor must be very carefully finished so that there will not be spots which are too deep or too shallow. If the floor is to be used for other purposes than skating, provision should be made for quickly draining and refilling.

Air Binding

Special provision must be made to eliminate air from brine coils, especially after draining and refilling. One method is to connect the return bends of the coil at the end opposite the headers, to a vent. Other devices remove entrapped air from supply and return headers. Proper venting is important or trouble will be caused by brine failing to circulate in some coils and by difficulty in filling the system.

Coil Temperatures

Efficient coil temperatures vary from about 10 or 12 degrees F, for embedded pipe, to 18 or 20 degrees for submerged pipe. This is to maintain a sheet of ice, 24° to 30°, depending on the hardness desired, and a thickness of ¾" to 1½". Once the ice is frozen, it is necessary, only to remove the heat transferred from the air and space surrounding the ice and coil. Considerably more capacity is required if ice is to be removed and replaced than if it remains frozen for the season.

Capacity

The above temperatures are given as average and the following estimate of capacity will also be general. Exact determination of coil and condensing unit size could be made by carefully estimating many variables such as heat loads in the arena, time allowed for freezing, thermal characteristics of concrete, pipe, etc. and weight of materials to be cooled. A study of successful installations shows the following to be good practice:

One ton of refrigeration will supply 100 to 175 square feet of ice surface, freezing the required quantity of ice in about 12 hours. Less than half that capacity would be necessary for a rink which would remain frozen throughout the season. Once frozen, the refrigeration system must remove about .5 Btu. per minute per square foot of ice, depending upon the temperature of the air over the ice, and ice temperature.

Brine, circulated at about 2 gallons per minute, or fast enough to permit a temperature rise of about 2 degrees will usually be satisfactory.

About 3 lineal feet of pipe will be required for each square foot of ice surface.

Two or more machines are almost invariably installed, rather than one large one, the two to be operated while ice is being frozen, and only one to maintain it in proper condition. Reciprocating ammonia compressors are used more than other types, though a Chicago rink uses two 140 ton contrifugal compressors, serving about 35,000 square feet, or about 125 square feet per ton.

Direct expansion coils would probably give somewhat better performance in square feet per ton if the refrigerant could be uniformly distributed to all parts of the floor. Where this can be accomplished, and the volume of refrigerant is not too great, good results may be expected with direct expansion. Obviously, a non-toxic and non-flammable refrigerant should be used. Long coils should be avoided, for maximum compressor capacity and efficiency. Multiplicity of refrigerant circuits adds to distribution difficulties and, for this reason, larger rinks favor circulating brine through floor coils.

(Continued on page 78)

An Inexpensive Solution To a darkroom Problem

By STEPHEN PORTER LATHROP

AN INEXPENSIVE application of refrigeration to a development tray for the development of negatives used in offset printing was recently worked out in Columbia, S.C. by Coy's Refrigeration Service, W. Columbia, S.C. for the Crowson-Stone Printing Co. of that same city. This firm does a great deal of offset printing which means that it must develop its photographic negatives used in the offset process of printing. In order to secure negatives that will produce the best printing results it is necessary to have temperature control. The temperature of the development solution should be about 68 degrees with any temperature between 65 degrees and 70 degrees working out very well. The maintainance of this temperature was impossible without artificial means of maintainance because tap water often runs between 78 degrees and 80 degrees.

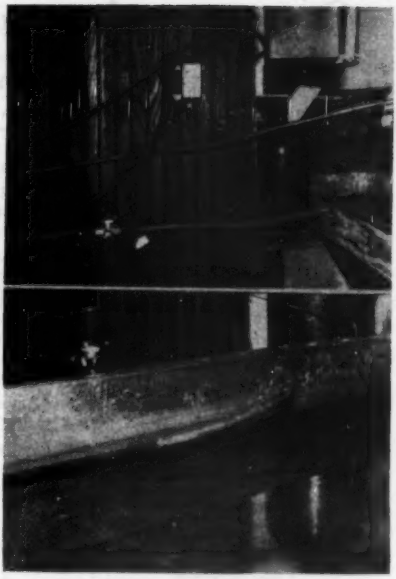
Used Coca Cola Box

The firm already had an old Coca Cola box which it used for keeping its chemicals and solutions cool. Charles E. Stone owner of the printing firm believed that this could be used to maintain temperatures in the developing tray. The refrigeration man was called in and worked out the inexpensive arrangement in use today.

A wooden tray was made sufficiently large to take any offset negative that might ever be used. Then this wooden tray was lined with sheet copper. A coil was made of copper tubing to fit around the inside of the Coca Cola box so that the cold water in this box could be utilized to cool the water that would run through the copper tubing coil.

A thermostatic control was located in the developing tray and connected with a solenoid valve which was in the copper tubing line running from the Coca Cola box to the developing tray. This thermostatic control was set at from 65 degrees to 70 degrees.

One end of the copper tubing coil was connected with the city water supply to take the city water into the Coca Cola box and through the coils. The other end was run to the developing tray with the solenoid valve in this line. When the developing solution goes above 70 degrees the solenoid valve, actuated by the thermostatic control opens and lets flow into the developing tray sufficient cold water to drop the temperature to 70 degrees after which the solenoid valve is actuated and the valve shut off.



These two pictures show the control system and the cooling tray arrangement for the darkroom. The upper photo shows a solenoid valve controlled by a thermostat which regulates flow of chilled water to the cooling tray shown in the bottom photo.

Cost is Low

The firm had the Coca Cola box so it was not necessary to buy this. But used boxes are obtainable at around $75.00. Exclusive of this box the whole layout cost less than $125.00. Including the Coca Cola box, the total cost was less than $200.00. The setup does the same job as a temperature sink that would cost around $1,000.00.

In order to avoid the loss of temperature in the water travelling between the box and the developing tray, the tubing was insulated with rubber hose.

Construction and Operation of The Admiral Dual-Temp Refrigerator

THE Admiral Dual-Temp, as its name implies, is a two-temperature refrigerator. By means of two cooling systems, the two compartments in the Dual-Temp are separately refrigerated.

By means of the illustrations on these pages, the construction of the Admiral Dual-Temp is shown in some detail and the function of the various parts is explained in the accompanying discussion.

A feature of the Admiral Dual-Temp is the independently controlled secondary system. Because of the importance of this feature, the following explanation of the operation of the Admiral Dual-Temp begins with a discussion of the secondary system.

This series of articles, taken with permission from the Admiral Corporation service manual, describes the operation and construction of the Dual-Temp Models TD746 and TD946. Service instructions not included here are made available by the manufacturer to those who need them.

The secondary system is shown attached to the food compartment liner in Fig. 1, and is diagrammatically illustrated in Fig. 3. The secondary system consists of a se-

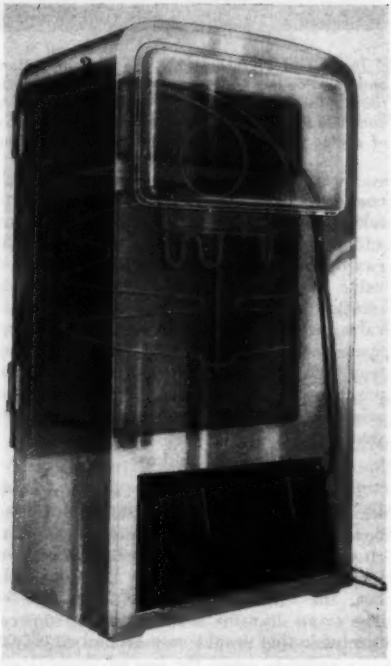


Fig. 1—A phantom view through the refrigerator showing the arrangement of the secondary system.

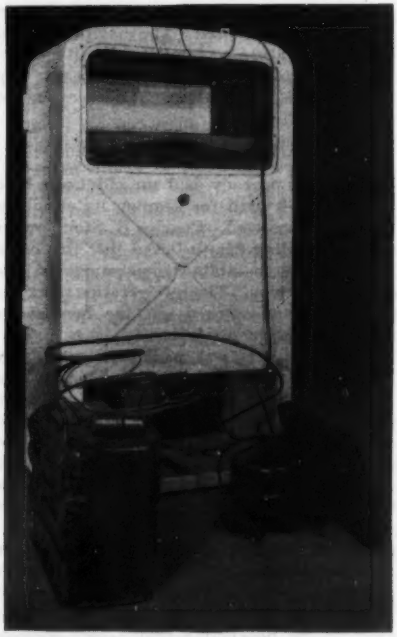


Fig. 2—The condensing unit, freezer, locker and primary transfer plate which make up the primary system.

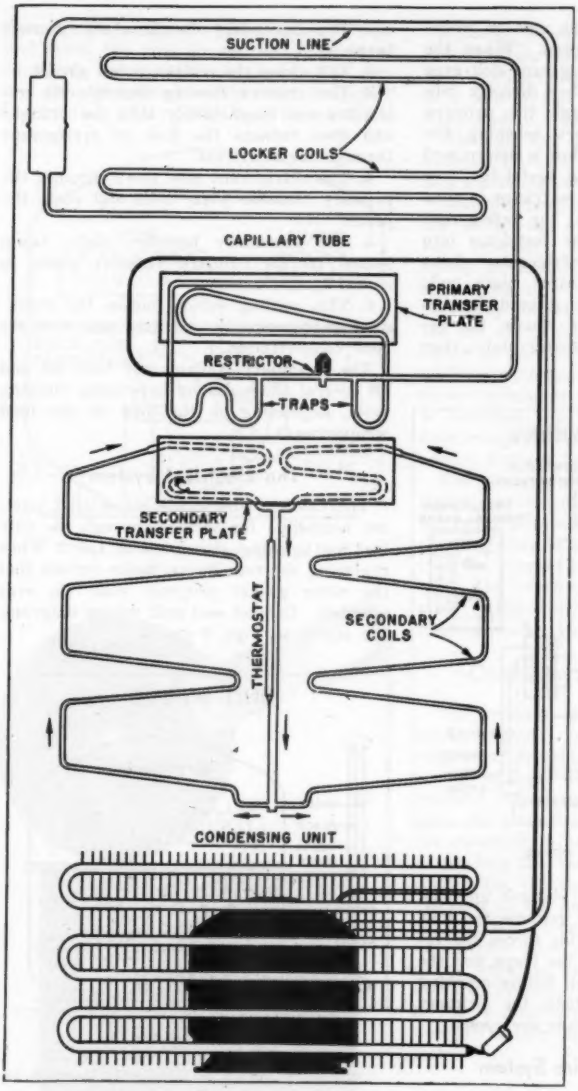


Fig. 3—Diagram of primary and secondary system.

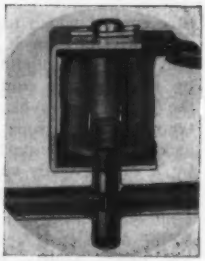


Fig. 4A—Restrictor in open position.

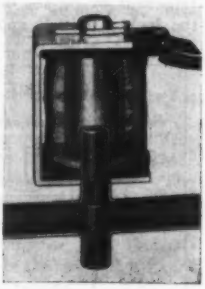


Fig. 4B—Restrictor in closed position.

ries of coils connected to a transfer plate at the top. A charge of "Freon-12" is sealed in the secondary system and is caused to circulate by cooling the secondary transfer plate; the direction of flow is indicated by the arrows in Fig. 3. As the "Freon" is cooled, it moves downward, and leaves the secondary transfer plate tubing to flow down the vertical tube and into the secondary coils attached to the liner. The food compartment is cooled by the circulation of the cold "Freon-12" through the secondary coils.

The Primary System

The primary system consists of the freezing locker coils, primary transfer plate and restrictor, condensing unit, and associated tubing (see Figs. 2 and 3). These parts are assembled to make up the complete sealed unit as shown in Fig. 2.

The temperature in the freezing locker is controlled by the primary (locker) tempera-

ture control which turns the unit on whenever refrigeration is required. When the unit starts, the liquid refrigerant delivered by the capillary flows either directly into the locker coils, or through the primary transfer plate coils before reaching the locker coils. The path of flow is determined by a magnetically-operated restrictor (see Figs. 3 and 4). When the restrictor is open (plunger down, Fig. 4-A), the refrigerant passes directly through the restrictor into the locker coils. No refrigerator flows through the primary transfer plate coils because of the resistance offered by the traps (Fig. 3). In other words, the refrigerant by-passes the transfer plate; thus the locker only is cooled.

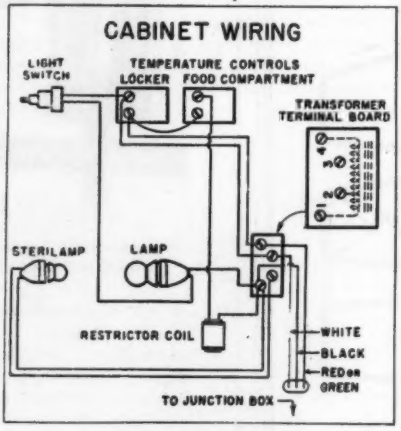


Fig. 5—Cabinet wiring.

In the closed position (plunger up, Fig. 4-B), the plunger greatly reduces the flow through the restrictor. This forces the refrigerant to flow through the traps and the primary transfer plate coils before reaching the locker. Therefore, both the primary transfer plate and the locker are cooled.

Operation of Entire System

The primary and secondary transfer plates are bolted together; thus the secondary plate is cooled by conduction when the primary plate gets cold. This method is used to cool the secondary system without any refrigerant flowing from one system to the other.

When refrigerant is required in the food compartment, the following takes place:

1. The secondary temperature control turns on.
2. This closes the restrictor coil circuit.
3. The current flowing through the restrictor coil magnetically lifts the plunger and thus reduces the flow of refrigerant through the restrictor.
4. The refrigerant now flows through the primary transfer plate coils and cools the plate.
5. The secondary transfer plate, being bolted to the primary transfer plate, is cooled by conduction.
6. This cooling action causes the secondary refrigerant to circulate and cool the food compartment.

The secondary control may turn on and off several times during a primary running cycle, depending on the load in the food compartment.

The Electrical System

The cabinet wiring and associated parts are accessible for service through the cabinet rear opening, shown in Fig. 1 or 2. When replacing the rear cover, make certain that the cover gasket properly seals the rear opening. Cabinet and unit wiring diagrams are shown in Figs. 5 and 6.

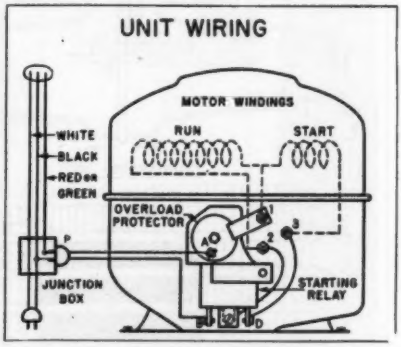


Fig. 6—Unit Wiring

The unit wiring is accessible through the front of the cabinet by lifting off the machine compartment door. The junction box is mounted on the back rail in the unit compartment. The unit power cord connects to the junction box through a standard fixture plug.

The two temperature controls in the Admiral Dual-Temp are mounted on the inside of the cabinet just above the cabinet

rear opening. The locker (primary) control turns the unit on and off as required to satisfy refrigeration demands. The control tube is located on the inlet tubing of the freezing locker. The food compartment

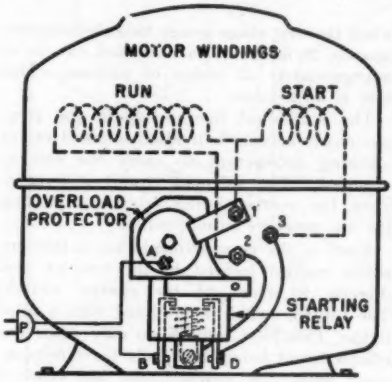


Fig. 7—Motor windings and relay outline.

Fig. 8—Functional construction of the relay and overload protector.

(secondary) control closes the restrictor coil circuit when refrigerant is required in the food compartment. Its control tube is placed in a well on the vertical tube of the secondary system. (See Fig. 8).

The light switch is mounted in a "plug in" receptacle which is located between the control knobs on the front of the cabinet.

The Sterilamp transformer is mounted on the inside edge of the flange on the cabinet rear opening. The transformer terminal board provides a conveniently accessible connector block for the various circuits. The Sterilamp socket is mounted and sealed to the top of the food compartment liner. The collar on the socket seals against the base of the Sterilamp, thus completely sealing the socket opening in the liner. The lamp socket is mounted and sealed to the top of the food compartment liner and is accessible for service through the cabinet rear opening.

The starting relay and the overload protector are mounted on the bracket under the cover box on the front of the unit. The starting relay is a magnetic switch that controls the current in the motor starting winding. The overload protector is a thermostatic switch which shuts the unit off if overheating occurs for any reason.

Operation of the Sealed Unit

The primary system is made up of the condensing unit, primary transfer plate and restrictor, freezing locker coils, and associated tubing. The various parts are assembled together, making up the sealed unit, the term "sealed" being used because the assembly is actually sealed by brazing or welding the various parts together. By convention, the motor compressor assembly (located in the machine compartment) has come to be known as the "unit." Fig. 7 is an outline view of the unit showing the motor windings and the starting relay and overload protector. The two phantom views in Fig. 8 illustrate the functional construction of the starting relay and overload protector.

Motor

The two windings in the motor are the "starting" and "running" windings. In order to start, both windings must receive current, but as normal running speed is approached, the current in the starting winding must be shut off. This is accomplished by the action of the starting relay. A minimum

(Continued on page 78)

Accuracy of Control Features Sub-Zero Test Cabinet

RAPIDLY obtained and accurately controlled temperatures ranging from plus 30 degrees to minus 100 degrees Fahrenheit can be provided in any of the five compartments of a refrigerated cabinet, designed and manufactured by Refrigeration Systems, Inc., Chicago, for cloud and pour testing of petroleum products. It incorporates operating features which give it versatility for general industrial testing purposes. Equipped for either immersion or dry cooling methods the cabinet is designed to maintain temperatures within one-half a degree, plus or minus.

These low temperatures and accuracy of temperature control are made possible by a sub-cooler, which reduces the refrigerant temperature to minus 30 degrees before entering the expansion valves; a special electrically controlled circuit actuated by five thermostats; and a three-stage condensing unit operated by one motor.

Operating Pressures

The system is illustrated diagrammatically on the next page and the cabinet in operation is shown on the front cover. Flexibility and ease of control is provided by the elaborate electrical control system in which a master switch actuates a main solenoid valve and also energizes the five compartment switches permitting liquid refrigerant to enter the system. As the refrigerant enters the system the pressure created operates a low pressure control switch located in the relay box; this in turn actuates the magnetic starting switch starting the motor. The operation of the master switch turns on the master switch pilot light which operates only when the pressures in the system are safe for normal compressor operation. This is done automatically by a pressure throttling switch which is in series with the master valve and the pressure throttling bellows is connected to the third stage suction.

The pressure throttling range is set to cut the master solenoid in when the third stage gauge is below 5 pounds, and it cuts out at approximately 10 pounds. This is adjustable. The pressure control setting on the compressor is to cut the machine out when the first stage gauge indicates approximately 28 inches of vacuum, and cuts in at approximately 22 inches of vacuum. This also is adjustable.

The individual thermostats in the compartments actuate individual solenoid valves allowing refrigerant to enter the coil as required. The solenoid circuit also energizes the corresponding relay, by passing the low pressure cutout switch.

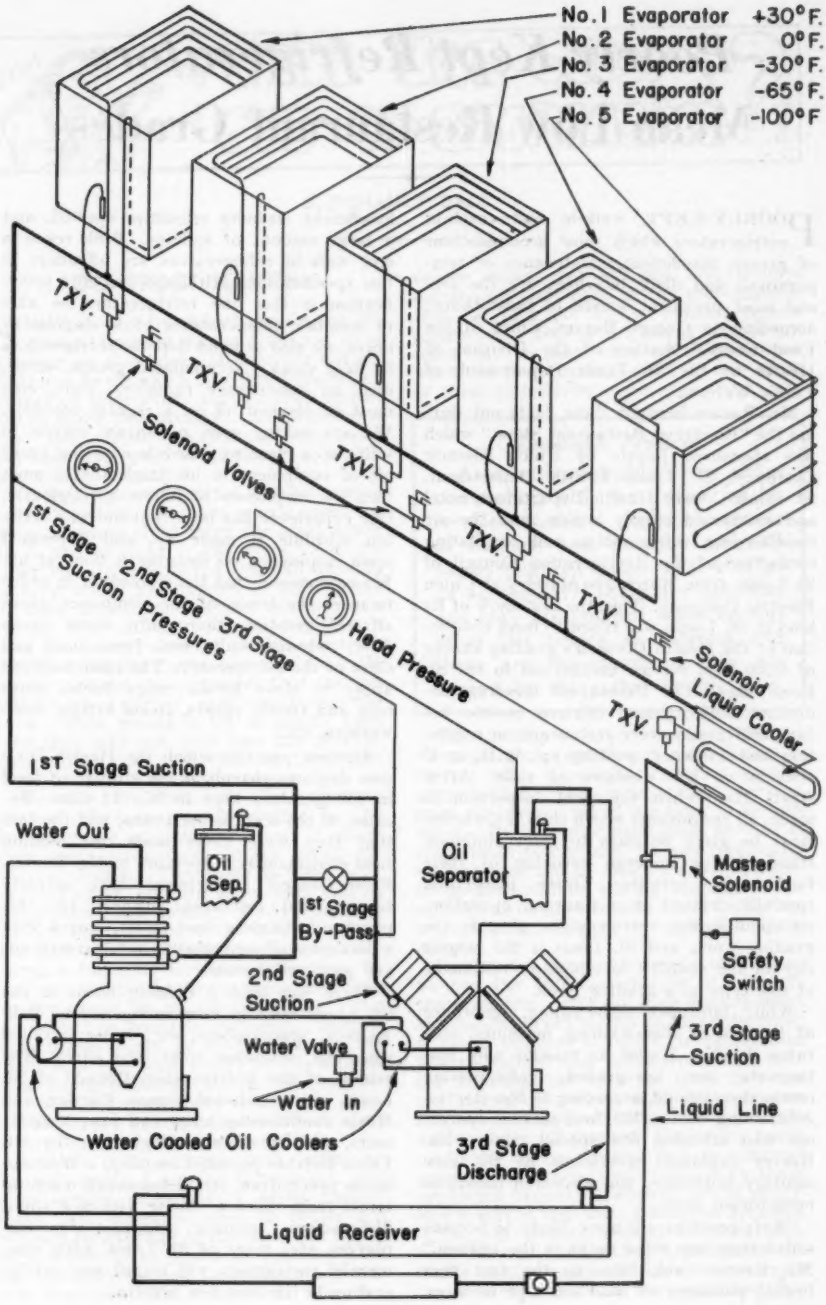
Each of the compartments has a thermostatic control located in the interior and directly in front of the control switch. The control switch is equipped with a pilot light. This pilot light is on only when the compartment being used calls for refrigeration; when the compartment has reached the temperature required as set by the thermostat, this pilot light will go out indicating that the temperature has been attained. The light may go on and off periodically to hold the temperature setting.

The master switch controlling the main solenoid is located at the front center of the cabinet and is also equipped with a pilot light. This pilot light remains off until the suction pressures are lowered sufficiently to allow the compartments to be controlled by their individual thermostats at safe operating pressures.

The system is charged with "Freon-22" and the first stage operates on suction pressures from 24 to 28 inches of vacuum; the second stage 10 to 25 inches of vacuum and the third stage from 15 pounds to 20 inches of vacuum. Head pressure ranges from 90 to 160 pounds gauge.

The compressor consists of two Servel pumps. The first stage is a Model "T" 4 cylinder, 2⅛" bore by 1¾" stroke. Speed approximately 1170 Rpm. The second and third stages are a Model "Q" compressor of which the first 3 cylinders are the second stage and the last cylinder is the third stage. They are of 1¾" bore and 1¾" stroke. Speed approximately 1030 Rpm.

Water cooled crank case oil coolers are used on the "T" and "Q" pumps to keep the oil at safe operating temperatures. An oil return is used on both compressors normally connected to return the oil through a shut-off valve into the compressor crank cases.


No. 1 Evaporator +30° F.
No. 2 Evaporator 0° F.
No. 3 Evaporator -30° F.
No. 4 Evaporator -65° F.
No. 5 Evaporator -100° F
TXV.
TXV.
TXV.
TXV.
TXV.
TXV.
Solenoid Valves
1st Stage Suction Pressures
2nd Stage
3rd Stage
Head Pressure
Solenoid
Liquid Cooler
1ST Stage Suction
Water Out
Oil Sep.
1st Stage By-Pass
Oil Separator
Master Solenoid
Safety Switch
2nd Stage Suction
3rd Stage Suction
Water Valve
Water In
Liquid Line
Water Cooled Oil Coolers
3rd Stage Discharge
Liquid Receiver

Poorly Kept Refrigerators Mean Low Restaurant Grades

POORLY-KEPT, walk-in and reach-in refrigerators which show accumulations of grease, insufficient maintenance of temperature, and dirty interiors, are the second most prevalent source of insanitation, according to George Reeves, Chief of the Food Control Section of the Division of Health of the St. Louis Department of Public Welfare.

Mr. Reeves brought those facts out during the "Electrical Restaurant Show," which was sponsored jointly by Union Electric Company, St. Louis Health Department, St. Louis County Health Department, hotel and restaurant supply houses, and the air conditioning, refrigeration and ventilating committee of the Refrigeration Council of St. Louis, from March 3 to March 7 at Union Electric Company. This, the first show of its kind in St. Louis, was timed to meet completion of the Health Division's grading survey of 3,000 food service institutions in the St. Louis area. The Restaurant Grading Ordinance 43518, passed thirteen months before, will grade every restaurant on sanitation and efficiency, putting up A, B, or C stickers on the windows of each. After April 21st, when the final inspection is made, all restaurants which show a C sticker must be given 30 days to meet minimum standards, or undergo revoking of their food-service permits. Thirty inspectors, specially trained in restaurant operation, air conditioning, refrigeration, etc., do the grading work, and St. Louis is the largest city in the country to adopt an ordinance of this type on a grading basis.

While improper dishwashing, ignorance of the use of dish-washing machines, etc., rates the No. 1 spot as reasons why restaurants are low-graded, refrigeration comes close behind, according to Mr. Reeves. Addressing some 1700 food-service operators who attended five special clinics, Mr. Reeves explained provisions of the new sanitary ordinance, and answered questions open-forum style.

"Refrigerators are more likely to become soiled than any other point in the kitchen," Mr. Reeves said, "due to the fact that broken packages of food are kept in them, insufficient cleaning schedules applied, and a large amount of spillage. Both reach-in and walk-in refrigerators are offenders in this specification. Although our only specification is that the refrigerators be able to maintain temperatures of 50 degrees or lower, we also demand that the refrigerators be kept clean. Accumulated grease, scrap, dust on compressor radiators, coils, etc., must be cleaned off on a regular schedule. We are asking each restaurant owner to write up a cleaning schedule covering every bit of equipment in his kitchen. He must then ask employees to follow it religiously. Our experience has been that unless a written schedule is made up, and impressed upon employees, no cleaning is done at all. We recommend that the restaurant in order to meet the terms of the Ordinance, clean all refrigerators thoroughly every seven days, including units, box, front, back and sides of the refrigerator. The same methods apply to stove hoods, range backs, stove tops and fronts, slicers, steam kettles, dishwashers, etc."

Another practice which the Health Division deplores sharply is the storage of food in refrigerators kept in No. 10 cans. Because of the seam in such cans, and the fact that they were never made for holding food continuously, inspectors in Mr. Reeve's Food Control Department have severely reprimanded restaurant owners for this practice. Stainless steel insets, stored with a maximum of recirculating refrigerated air, are proposed instead.

There has been a definite boom in the St. Louis area in new refrigeration, dishwashers, glasswashers, etc., being installed since the ordinance went into effect. The exhibit of the Refrigeration Council of St. Louis, which included Gemco, Carrier, and Marlo conditioning units and heat transfer units, plus reach-in refrigerators by St. Louis Butcher Supply Company, a Westinghouse precipitron, etc., commanded much interest from visitors. Along with new sinks, dishwashers, training schedules for employees, etc., many of St. Louis' 3,000 commercial restaurants will install new refrigeration in the next few months.

By DONALD F. DALY

CONTRACT SERVICE

SHOULD an independent serviceman tie himself up with contract service, or is it better to stay clear of contract obligations and be strictly a free-lance operator? Sooner or later every service shop owner has to make this decision. Both methods have been used successfully and there is a wide difference of opinion as to which is the more effective.

At first glance contract service seems very attractive. It gives a new operator some business right from the start when he is apt to need it the most. On the other hand it means that he will have to take on every job handed to him by his contract dealers, and believe me they can dig up some dillies. The dealer doesn't have to worry about how his contract service company comes out on a job. He simply assures the customer that the job will be taken care of, and then passes the buck. This means a lot of tough jobs. Jobs that will not only lose the serviceman money, but will take up time that could be used more advantageously.

However, in spite of this, contract service offers many advantages to the small service organization, and it offers even more advantages to the small appliance dealer. The large dealers will, in most cases, operate their own service department, but it isn't always possible for the small dealer to do this. He may not have enough service work to justify hiring a full time service engineer, or he may not be able to hire a competent man for the salary he can afford to pay. Then too, the time spent in running a service department could, in many instances, be spent in a way that would be more beneficial to his business. With the competition that will inevitably follow the present boom, the average dealer will do well to devote all of his time to selling.

It takes quite a large cash outlay to properly equip a service department, and such service departments often occupy space that could be used to better advantage for storage or display. An appliance dealer is in business, primarily, to sell refrigeration and to build up a profitable business. To accomplish this, the dealer must give efficient and prompt service on that part of his merchandise that is covered by a manufacturers' guarantee. Unless he has a competent mechanic to take care of such service work, he is apt to fall short on one or all of these objectives.

Seventh Article

As a business builder, how about contracting with the dealer for his service? Is this a profitable source of business and can you maintain happy relations under what kind of an agreement? These are questions you may ask yourself when considering this source of business and these are the questions ably answered by the author in this issue.

That is why it is very much to the advantage of the small appliance dealer to tie up with a reliable contract service organization. An independent serviceman can devote all of his time to service work. He can give high class service at reasonable prices, and he can frequently be instrumental in making sales and creating good-will by giving a constructive opinion as to the advisability of replacing, or repairing, obsolete or worn out equipment.

But he can give such service only when he has the full cooperation of his contract dealers. After all, high quality work at reasonable prices can be had only when a large volume of work is obtainable. Many dealers, and servicemen too, take the shortsighted view in that they are too much concerned with the present, and not enough concerned with the future and the over all picture. There are many problems to be worked out in contract service, but there is no reason why these problems cannot be worked out if everyone involved will take a sensible attitude.

The serviceman should be sure that, both he and the dealer, understand the terms of the guarantee service contracts the dealer has with the manufacturer

whose equipment he handles. This is very important. It frequently happens that neither party has a very clear understanding of these contracts. Since a large percentage of the service work done for an appliance dealer will stem directly from such contracts, it is essential that they be thoroughly understood.

Once the preliminaries are out of the way, and both the dealer and the serviceman have satisfied themselves that they are dealing with a responsible person, the terms of the contract should be drawn up. Nothing should be assumed and nothing should be taken for granted. If this realistic attitude is taken there is no reason why an arrangement cannot be worked out that will be satisfactory to both parties.

The first step should be to draw up a schedule of prices for labor and material, and this schedule should be rigidly adhered to. In fairness to both parties it might be a good idea to open the price schedule for revision after a reasonable length of time in order that any inequalities which might develop, and which might be against the best interests of one or both parties, could be worked out.

It is pretty difficult to visualize all of the problems that might come up in contract service. Especially for the man who has never had any experience along this line. I think that the best way to illustrate some of the pitfalls to watch out for is to tell what happened to me on my first crack at contract service.

A few years ago I was looking around for a location to set up my own refrigeration service shop. I had been working as a refrigeration service engineer for several years and a service shop of my own looked like a pretty soft touch. I wanted to play it safe by lining up contract service for one or two dealers so I would have some business to depend on until I could get started. Since I planned on setting up in a small town I felt that an association with an established merchant would also help me to break down the resistance that is usually encountered by a stranger in a small town.

I had been working on Kelvinator equipment for some time so I called on the district distributor for that area to find out if he knew of a good location. When I told him what I had in mind he greeted me like a long lost brother. He had just the spot. One of his dealers in a place some sixty miles away was looking for someone to do his service work on a contract basis. It was a good live town of about five thousand population and was located in the center of a large and prosperous oil producing area. He assured me that there was no service shop in this town and that people were 'crying' for service. I wondered about this. If it was such a good location, why hadn't someone moved in.

But I decided to look the situation over, and armed with his letter of introduction and two letters of recommendation from former employers, I went to see this dealer. Sure enough he was anxious to have a competent serviceman set up shop and handle his work. I looked the town over thoroughly and, so far as I could determine, there was no service shop in town. Everyone had been getting his service done in the county seat, which was sixty miles away. I spent three days looking around and it looked like a good spot. The restaurants, bars, stores, and theaters were well patronized and the town seemed to be booming.

This dealer wouldn't sign a hard and fast contract, but we finally agreed that I was to do all of his service work on units that were still under the manufacturer's guarantee, and at the prices set by the manufacturer for such work. In exchange I was to get all of the service calls that came into his store on units that were not on a guarantee. He also agreed to run a classified ad in the local paper to let people know that he was offering refrigeration service. I was to use his store as my headquarters and to have the use of his telephone numbers for my business cards and for any additional advertising I might do. I rented a small store nearby to use as a shop. It looked like a good set-up and three days later I was in business. I want to state

> Note: Based on the experiences of the better known manufacturers over a period of three years, an average between one and two service calls can be expected on new domestic refrigerators during the first year. An allowance of four to five dollars per refrigerator is made for this service, depending on the maker's experience.

that all of my dealings with this man were pleasant and profitable and he treated me as fairly as conditions would allow. I wish I could say the same for the other dealers I took on later under this same arrangement.

I hadn't been in business very long before I found that I was not getting enough calls through this dealer to keep me busy more than half the time. I also found that I wasn't having much luck in getting the commercial work I had expected. Most of the commercial equipment had been bought in the county seat, and over the years people had gotten into the habit of going back to the seller for their service work. Even though it cost them quite a lot for mileage. I didn't have the whole picture at that time, but it was beginning to shape up.

My next step was to call on all of the other appliance dealers in town and try to line them up on contract service. I hadn't done this before because I didn't want to tie myself up with too many dealers until I found out how the arrangement was going to work out. Almost all of them were anxious to have me do their work. They wouldn't sign anything, but they assured me that they would give me all their work and that there would be no trouble. I thought I was all set, but as it turned out my troubles were just beginning.

Beware of Dealer with "Own Man"

We went along under this arrangement for a while and it seemed to be working out fairly well. I was getting a lot more calls, but I was puzzled about the type of calls I was getting. For instance, one dealer had given me quite a few jobs, but here is what they were: four Grunows, two Majestic sealed units and one Majestic Standard; two Hot-Point semi-sealed units; one Cold-Spot, and a water cooler that was wet and the compressor had frozen up.

I had expected to get jobs like these. Every service shop does get them. Although they are tough jobs and frequently impossible to handle in a small shop. I couldn't understand this run of tough jobs. It seemed to me that by the law of averages I should get at least a few good jobs. I called on this dealer and asked him about it. His reply was a shock.

"Why," he said, "I didn't understand that I was to give you all of my service calls. I thought I was to give you only those calls that my own man couldn't handle."

"Your own man! I didn't know you had your 'own man.'"

"Oh, yes," he replied. "Bill has been with me for years. He isn't exactly a refrigeration mechanic, but he has learned to do minor repairs on radios, washing machines, and refrigerators. He can change belts, motors, thermostats, put on door gaskets or hardware, and all sorts of jobs like that. He's very handy."

He sure as Hell was. So handy, in fact, that he was practically putting me out of business. What it amounted to was that this dealer was keeping all of the small, quick money jobs. The little jobs that mean anywhere from $3.00 to $15.00 to a service shop owner, and which he must have along with the tough jobs to round out his business. Without them he cannot operate at a profit.

It didn't take me long to discover that nearly everyone of my contract dealers, except the original one, had his "own man." They had all been keeping the good calls and giving me the "dogs." Well, there wasn't much I could do about it. I didn't have a legal leg to stand on, and I had taken a lot for granted. So, before you enter into a service contract with a dealer, be sure he doesn't have his "own man."

Building Good-Will

Another aspect of contract service that should be taken into consideration is building good-will for your contract dealers. Most dealers expect the serviceman to further their interests with the customer, even to the extent of cutting down his bill, but they do not as a rule make any effort to compensate him for his loss in doing this. This problem comes up with exasperating regularity and some method of dealing with it should be written into the service contract. To show what I mean I cite a typical incident. I would get a call from one of my dealers saying that he had a job for me, but he wanted to talk to me about it before I went out. I'd go to his store and his tale of woe would go something like this.

"Don, Mrs. Jones, who lives out of town a few miles, has an old refrigerator that is giving her some trouble. It's an old box and pretty well worn out. In fact, they are going to buy a new one. Mr. Jones was in last week and signed a contract for a new deluxe eight cubic foot model, but he doesn't want to take delivery until his wife's birthday which won't be for a couple of months. I know that under the circumstances they won't want to spend very much on the old box. See what you can do for them. But for Heaven's sake don't do anything that will queer my deal for the new box."

So I started out with two strikes on me.

A worn out old crate and I wasn't supposed to charge very much. When I arrived at Mrs. Jones' I found that someone had tried to speed up the defrosting process and had stuck an icepick into the evaporator. Since it was a sulphur job and operated under a vacuum, it had taken in moisture and the compressor had frozen up. Fortunately, the belt had broken, so the motor was all right. I explained to Mrs. Jones that the unit was in bad condition and would have to be completely dismantled and overhauled. I gave her a price of $45.00. Which, to my way of thinking, was plenty cheap.

Mrs. Jones said that she just couldn't spend that much money on the old box. She knew her husband was "surprising" her with a new one on her birthday.

Oh! I can't spend that much - My husband is going to 'surprise' me with a new one for my birthday next month - Just give me a two dollar job to last that long.

Wasn't there some way I could patch it up so it would run for a while. After all, it was only two months. (Sure lady, we perform miracles every day.) Well, here was a fine spot to be in. If I told her it couldn't be done she would be very unhappy. Not only with me, but with the dealer that had sent me out as well. On the other hand, if I tried to patch it up and made even a small charge, and then it failed to run the two months, she would be even more unhappy. Any way you looked at it I was on the spot.

But you have to take chances in this business, so I pulled the compressor off, heated it up with my presto torch and got it turning fairly free. Then I put in a pint of xylene and ran it for thirty minutes. After that I dumped the xylene, flushed the crankcase with carbon-tet and filled the crankcase with about half oil and half xylene. I put the compressor back on the line, pumped down to zero pounds, put a small brass screw in the icepick hole, ran some solder around the screw head, and started it up again. I watched it for a while and it seemed to be running all right so I collected $9.00 and took off for town, mumbling to myself and wondering how I got into such things. I didn't know if the unit would run for fifteen minutes or fifteen years, and I didn't care very much. Incidentally, it did run the two months, and for all I know it is still running.

I could understand the dealer's viewpoint on this deal. He wanted to make his sale and earn the good-will of his customer. That was fine, but he didn't have any right to earn this good-will at my expense. I was put on the spot and there was no way I could win. If the old crate failed to run the two months I would have been accused of being a poor mechanic and a sharpshooter. And if it did run all right until the new box was delivered I didn't stand to gain anything. I had collected $9.00 for the job, but $1.35 of this was for a new belt; $.50 was for oil and xylene, and $1.20 for mileage. You can't stay in business on that sort of job.

Here again it is evident that there should be a clear understanding of the relationship between the dealer and the contract serviceman. The dealer has a right to expect his serviceman to help him build good-will toward his business, but the serviceman should not be put on the spot and he should not be expected to take a loss on such transactions. In all fairness the dealer should arrange to absorb part of the cost of these cumshaw jobs.

This example I have cited may seem like an extreme case, but I can assure you that it is not. As a matter of fact it is a very mild example. I don't know how many times I have gone out on calls for dealers with the admonition that I was to take it easy on Mrs. So-and-So because she was an old customer and was just about ready to buy a new radio or washing machine or refrigerator. It is impossible to operate a service business at a profit under such conditions.

Trade-Ins

Another problem that gave me a lot of trouble was trade-ins. Competition was pretty tough in those days (don't think it won't be again) and dealers would often allow more on a trade-in than it was worth. They would usually ask me to make an appraisal after the deal was closed. If the old box was in bad condi-

(Continued on page 76)

SERVICE POINTERS

A department for the exchange of ideas on new devices and methods of improving service work. Five dollars is paid for each pointer published. Write up your idea today and mail it to the Service Pointer Editor.

THERMOMETER CLAMP

HERE is a quick and handy clamp suitable for clamping dial thermometer feeler bulbs to condenser tubes, suction or liquid lines, or to evaporator tubes while

checking temperatures. Several types of these paper clips are available for about a dime each, at all stationery stores, but the one illustrated works out best. Several sizes are available.

DRIERS IN SO_2 SYSTEMS

THE proper use of driers in SO_2 machines has been debated for many years and in response to the frequent questions on the subject, Davison Chemical Co., makers of silica gel, have issued a statement through Henry Valve Company Technical Bulletin No. 1, stating that the most satisfactory results will be obtained in sulphur dioxide systems when the silica gel drier is placed in the low side as near as possible to the suction of the compressor because the low side is often under a vacuum which causes moisture to be drawn into the system if leaks exist. For the same reason it is recommended that the drier be twice the size of that used in "Freon" or other systems of like capacity that always operate at positive pressure.

In a sulphur dioxide system silica gel removes both water and sulphurous acid which forms almost instantaneously when moisture is added. In addition to corrosion damage resulting from the formation of sulphurous acid both water and sulphurous acid will react with the oil in the system to form sludge. The presence of sludge is very harmful for under the high temperature conditions existing in the compressor, sludge will accelerate the formation of deposits resulting in the binding or "freezing" of moving parts. Copper plating may also occur in sulphur dioxide systems if moisture and sulphurous acid are present. Freeze-ups in SO_2 systems due to the formation of ice are not ordinarily encountered because of the high solubility of water in the sulphur dioxide and in the low freezing point of the solution.

Silica gel driers of suitable size when installed in the low side of the sulphur dioxide system will prevent difficulty resulting from the presence of moisture.

CLEANING PLASTIC PARTS

MANY plastic parts are being used on modern domestic refrigerators and a warning on cleaning methods of these parts is timely. Most cleaning fluids will damage the surface of many plastic parts, therefore fluids containing gasoline, naphtha, carbon tetrachloride, lacquer thinner or any other grease solvent should never be used. To play safe clean only with soap and water.

SAG IN BELT MISLEADS ESTIMATE OF LENGTH

RELATION between sag and belt length is generally misunderstood, leading to an exaggerated idea of the difference

in lengths between V-belts on a Multi-V drive, a recent bulletin of The B. F. Goodrich Company, belt manufacturer says.

The bulletin contains a table given below, showing the differential in length between a belt which is tight and one which sags on the same drive, and says that a careful examination of the figures will surprise most operators of Multi-V drives. The table follows:

RELATION OF SAG TO LENGTH

Sag (Inches)	Center Distance (Inches) 10	20	30	40	50	75	100	200	300
½	.063	.037	.025	.010	.008	.004	....	....	....
1	.257	.130	.095	.074	.038	.018	.025	....	....
2	.991	.513	.343	.240	.20	.17	.054	.03	....
3	....	1.08	.78	.59	.44	.30	.12	.06	.035
4	....	....	1.51	1.03	.83	.60	.40	.21	.16
5	....	....	....	1.61	1.27	.87	.66	.37	.29
6	....	....	....	....	1.86	1.25	.94	.42	.35
8	....	....	....	....	....	2.12	1.79	.70	.53
10	....	....	....	....	....	....	2.60	1.32	.96

As an example the bulletin points to the belt on a drive with 50 inch centers which has sagged two inches below a belt on the drive which is tight. The sagging belt, the table shows, is actually only two-tenths of an inch longer than the tight belt. This increased length increment decreases as the center distance increases, the table shows.

The bulletin says that there are often reports of a belt which is "four or five inches" longer than other belts, but these are usually exaggerations based on the misunderstanding of the sag and belt length.

Rather wide variation in belt lengths on ordinary drives do not produce unsatisfactory operations, the bulletin declares, but also recommends that best performances can be obtained from matched sets of belts, the maximum variation in length of those which the company makes in any single set being less than 6 inches.

S S S

RECOLORING LEAD WIRES

MOST refrigeration units have a three wire cable leading to motor controls. The leads connecting to the motor are frequently stripped of their insulation due to oil and heat breaking down the rubber. When taped up they are difficult to connect without color identification so I carry two small bottles of touch paint—one white, one red—to color appropriate wires after taping. The black lead of course needs no coloring. *—Submitted by R. C. Power, Jr., Eustis, Fla.*

"I'M SORRY, MR. ICE MAN, BUT I JUST CAN'T SEEM TO FIND ROOM FOR IT."

U.N. HALL COOLED BY SKATING RINK EQUIPMENT

EVEN if debate should wax warm when the General Assembly meets in Flushing Meadow, delegates should manage to keep fairly cool. Maintenance crews are driving accumulated summer heat out of the chamber walls and on a trial run the temperature was down to 68 degrees and the air-cooling system working perfectly.

Norman S. Zink, superintendent of maintenance for the United Nations, figures he can keep temperature of 70 to 72 degrees in the great Assembly auditorium, even with animal heat and with light wattage at maximum.

Mr. Zink has noticed that delegates from the northern countries, such as Norway, Sweden and England, like the artificial cooling. South American delegates, generally, are uncomfortable in it. Neither the Arabs nor the Russians have complained about it.

The air-cooling system is a hold-over from the refrigeration plant used for the skating rink that was housed in the structure before the United Nations took over. Ducts have been led up into the attic. A blower system distributes the cooled air through ceiling vents at the rate of 300,000 cubic feet a minute.

S S S

TELEPHONE MY CAR FOR SERVICE, SAYS THIS SERVICE ENGINEER

DAVE GREENBERG, owner of AC Refrigeration Company, 837 Notre Dame street west, Montreal, Que., was driving around town one night in his telephone-equipped car when he suddenly remembered that he had some business to attend to in Toronto. He headed for the airport and enroute phoned Trans-Canada Air Lines' reservation office in Montreal to see if he could get passage.

That was early evening. And it was the first such call ever to be made to Trans-Canada Air Lines. "We'll phone you back as soon as we can confirm the reservation. Where can we reach you?"

"Phone me in my car. The number is 62366," came Greenberg's reply.

In a short time, the telephone in his car rang. "Your reservation has been confirmed on TCA Flight 49 for Toronto," he was informed. Greenberg continued on his way to the airport.

"We expect," says Dave, "to have our fleet of service trucks and cars equipped with these telephones, which will enable our engineers to keep in contact with the office or customer, thus eliminating useless miles of travel."

S S S

GOOD WILL BUILDER PROVIDES FREE SERVICE IN FLOODED AREA

CARTMELL'S Sales & Service, the Frigidaire dealership in Rutland, Vermont, has added a unique little chapter to the Company's ever-expanding annals of "good community relations" by providing its home appliance customers with one of the most unusual forms of disaster relief on record.

When waters of a flash-flood subsided, after having inundated a large section of the city of Rutland, the Frigidaire dealership was ready with a free "clean-up and inspection" service for customers, whose Frigidaire home appliances had been damaged.

Previous arrangements had been made with the dealership's nearby Middlebury office for additional crews of service men and extra trucks. Frigidaire refrigerators and other home appliances, which were out of service and damaged by the flood waters, were picked up and trucked to Middlebury. There, they were pressure-cleaned, dried, repaired and put into running condition before being returned to Frigidaire users in Rutland.

The program was boosted along by a half-page advertisement, addressed to Frigidaire household appliance users in the flooded area, in the Rutland Daily Herald. It read: "As a service to all Frigidaire household appliance users we have arranged with our Middlebury office to send to Rutland, crews of refrigeration service men and trucks to pick up your Frigidaire appliances, which will be taken to Middlebury, pressure-cleaned, dried, inspected and put in running condition and returned to you on a no charge basis. This will not include cost of replacement parts needed, unless such parts and installations are authorized by you. We are happy to do this in appreciation of your patronage and friendly cooperation."

The dealership reported that there had been 34 Frigidaire appliances cleaned and serviced for homes in the flood zone within a few weeks and there are still many more to be done.

Cartmell's estimated labor costs thus far are only about $300; customer goodwill—immeasurable.

BEER SYSTEM USES CIRCULATED AIR COOLING

JUST about the ultimate in beer cool'ng is claimed for a novel installation recently made by St. Louis Butcher's Supply Company in the Anthony Gerli Tavern, 16th and Clark, St. Louis.

The system consists of a walk-in cooler in the basement which will hold 16 half kegs of beer at a time. The 7x6 foot walk-in box is constructed of heavy oak, and is located to one side of a meat box of the same size which is cooled by the same circulating blower.

Refrigeration in the beer cooler is provided by a circulating blower operating at 25 degrees, thermostatically controlled, powered by a ½ hp. compressor. The low temperature which chills the beer in kegs is continued all the way to the draw taps, simply by running the copper tubing which carries the beer from barrel to bar up an 8x4 inch galvanized metal duct extending chimney fashion from cooler to bar rail above. The duct permits one way flow of the chilled air, with a separate return duct of the same size. This air, which begins at 25 degrees when pulled immediately from the circulating blower, is forced into the meat cooler at approximately 32 degrees, one half of the total 900 cfm. up the vertical duct arriving for meat cooling.

In addition to the two copper beer lines in the 12 foot vertical duct, there are two water lines running to separate taps at the other end of the bar. Beer kegs are attached to the vertical riser lines by rubber tubing. The Gerli Tavern averages five kegs per day of this "supercold" beer, and claims the system is one of the most economical possible.

S S S

SHIPMENTS OF AIR CONDITIONING AND REFRIGERATION EQUIPMENT

SHIPMENTS of components and accessories for air conditioning and commercial refrigeration equipment were valued at $46.4 million during the first quarter of 1947, according to the Bureau of the Census, Department of Commerce. The first quarter 1947 shipments set a new postwar peak, representing an increase of 26 per cent over the fourth quarter volume of $36.9 million, and continued the steady upward trend of previous quarters.

All major classes of components and accessories and complete air conditioning equipment continued to increase. The major items increased as follows: Condensing units, 19 per cent, from $19.1 million in the fourth quarter to $22.6 million in the first quarter; compressors and compressor units, 78 per cent, from $4.7 million to $8.3 million; centrifugal refrigeration machines, 7 percent, from $1.7 million to $1.8 million; heat exchanger equipment, 20 per cent, from $11.4 million to $13.7 million; and self-contained air conditioning units, 43 per cent, from $6.4 million to $9.2 million.

Scope of Survey

This release is based on reports submitted by 72 manufacturers of components and accessories and complete air conditioning equipment. Estimates were made for a few companies, representing only a small portion of the total industry, that did not submit their reports in time to be tabulated. The reports included in the release are believed to represent substantially all component manufacturers and air conditioning equipment producers.

The shipment statistics included in the report apply to equipment actually billed and shipped. These figures are equivalent to completed sales. Complete units delivered on consignment or shipped to a branch warehouse for stocks are not included until such time as they are actually sold. The dollar values shown are the manufacturers' net billing prices, f.o.b. factory. The data for some types of air conditioning and refrigeration equipment have been combined in the tables of this report in order to avoid disclosing the operations of individual companies.

The tables in this report present information on manufacturers' shipments of air conditioning equipment, and components and accessories for air conditioning and commercial refrigeration equipment. Table I below presents summary data on domestic and export shipments for the fourth quarter of 1946 and first quarter of 1947.

The data collected for 1947, beginning with the first quarter, differs to some extent from that collected during 1946. The purchases section of the form has been eliminated. The column on production of units incorporated in unitary equipment made in the same plant has been revised and now calls for data on the number of compressors manufactured by reporting plants and incorporated into units reported as shipped. Ice-making machines which were formerly surveyed annually are now included in the quarterly report.

TABLE I.—AIR CONDITIONING EQUIPMENT AND COMPONENTS AND ACCESSORIES FOR AIR CONDITIONING AND COMMERCIAL REFRIGERATION EQUIPMENT: SUMMARY OF SHIPMENTS BY MAJOR CLASS OF PRODUCT, FIRST QUARTER 1947 AND FOURTH QUARTER 1946

Product	First Quarter 1947 Shipments of Complete Units						Fourth Quarter 1946 Shipments of Complete Units					
	Total		Domestic[1]		Export[2]		Total		Domestic[1]		Export[2]	
	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)
SECTION I—COMPONENTS AND ACCESSORIES												
TOTAL	....	46,425,941	....	43,590,862	....	2,835,079	....	36,870,171	....	34,897,759	....	1,972,412
Condensing units	312,254	22,590,275	298,992	20,925,200	13,262	1,665,075	269,136	19,062,983	258,835	17,826,520	10,301	1,236,463
Ammonia refrigerants	332	389,166	298	350,988	34	38,178	317	393,636	292	356,916	25	36,720
Refrigerants except ammonia	311,922	22,201,109	298,694	20,574,212	13,228	1,626,897	268,819	18,669,347	258,543	17,469,604	10,276	1,199,743
Air cooled	300,255	17,602,325	287,950	16,364,220	12,305	1,238,105	253,896	13,448,971	244,575	12,586,624	9,321	862,347
Open type	129,653	11,554,429	120,110	10,572,356	9,543	982,073	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Hermetic type	170,602	6,047,896	167,840	5,791,864	2,762	256,032	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Water cooled	11,667	4,598,784	10,744	4,209,992	923	388,792	14,923	5,220,376	13,968	4,882,980	955	337,396
Compressors and compressor units	147,832	8,320,720	135,954	7,762,050	11,878	558,670	81,117	4,678,259	78,475	4,436,439	2,642	241,820
Ammonia refrigerants	783	1,996,870	690	1,791,302	93	205,568	625	1,371,101	561	1,236,061	64	135,040
Refrigerants except ammonia	147,049	6,323,850	135,264	5,970,748	11,785	353,102	80,492	3,307,158	77,914	3,200,378	2,578	106,780
Centrifugal refrigeration machines	84	1,837,409	75	1,718,758	9	118,651	78	1,724,066	75	1,671,406	3	52,660
Heat exchanger equipment	.....	13,677,537	....	13,184,854	....	492,683	....	11,404,863	....	10,963,394	....	441,469
Evaporative condensers	1,627	1,784,052	1,551	1,717,591	76	66,461	1,453	1,391,866	1,379	1,317,962	74	73,904
Unit coolers	48,385	5,608,699	46,109	5,361,996	2,276	246,703	55,084	5,506,059	53,405	5,274,081	1,679	231,978
Air conditioning	3,929	1,474,532	3,864	1,451,527	65	23,005	4,660	1,215,739	4,580	1,158,953	80	56,786
Refrigeration	44,456	4,134,167	42,245	3,910,469	2,211	223,698	50,424	4,290,320	48,825	4,115,128	1,599	175,192
Other heat exchanger equipment[3]	....	6,284,786	....	6,105,267	....	179,519	....	4,506,938	....	4,371,351	....	135,587
SECTION II—SELF CONTAINED AIR CONDITION UNITS AND ICE MAKING MACHINES												
Self-contained air conditioning units	18,749	9,168,212	17,096	8,477,909	1,653	690,303	14,365	6,390,796	12,991	5,915,682	1,374	475,114
Room type	11,656	2,691,627	10,207	2,243,435	1,449	448,192	9,510	2,119,615	8,255	1,753,428	1,255	366,187
Other than room type	7,093	6,476,585	6,889	6,234,474	204	242,111	4,855	4,271,181	4,736	4,162,254	119	108,927
Ice making machines	1,934	1,268,742	1,779	805,648	155	463,094	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

n.a. Not available.
[1] Continental United States.
[2] Includes Canada, Mexico, and United States territories.
[3] Includes condensers and liquid coolers, shell and tube and shell and coil types, as well as fin coils (heating and cooling) and plate type evaporators.

QUESTIONS and ANSWERS

On Problems of Servicing and Installation of Refrigerating Equipment—Send Your Problems to the Question Box.

METHYL JOB STUCK UP

QUESTION 805: I have a ¾ hp. compressor that is stuck up so tight that you can hardly turn the flywheel. This machine was installed about two years ago and never had a service call. The unit was charged with methyl chloride and worked fine up till now. I installed this system myself with a new blower coil, new valve, new tubing and large drier. After removing the compressor I find the inside coated with a varnish-like substance and I would like to know what it could be and how to remove it. Any information on the above would be greatly appreciated.

ANSWER: There are quite a few things that can cause deposits in a methyl chloride system. The most common is the grade of oil used. Refrigerating systems, as you know, should use a very high stability oil that will not break down under operating conditions encountered. Sometimes it is possible to secure unknowingly a poor grade of oil, particularly if you are changing to a brand unknown to you. The second factor is moisture. Moisture is the most common reason for this deposit. The moisture, over a fairly long period of time, will develop an acidic condition which in turn promotes the decomposition of the oil.

Aluminum in the system is another possible cause of the deposits, since aluminum in a methyl chloride system is a factor in the formation of a jelly-like substance. Aluminum, however, as you know, has another effect and that is the formation of explosive gases. This reaction has become very well known in the last few years through the warnings issued from many sources. A remote possibility is the type of gaskets used which may have soluble constituents in them. You may dissolve enough of these soluble constituents to coat the cylinder walls and gum up the compressor. This is probably an unlikely cause since gaskets in the last few years have been greatly improved.

Deposits that have the appearance of shellac or resin, coating all parts of the compressor, may be formed by the combination of a small amount of sulphur dioxide, moisture and methyl chloride, although it is possible that this same substance may be formed by the combination of moisture and methyl chloride only. This condition used to be quite common in earlier days when small amounts of sulphur dioxide was used as a means of imparting an odor to methyl chloride. It is also quite common to machines that have been changed from sulphur dioxide to methly chloride but all the sulphur has not been removed. Formation of these sludges is greatly accelerated by heat. High head pressures, small liquid lines, too much pressure on the discharge valve and various things of that nature may cause high velocity of the gas plus high discharge temperatures which may cause the oil to break down into a sludge of this nature.

In summing up we can say that heat and moisture are the two main factors causing this sludge. A combination of any two refrigerants will not cause trouble without moisture and heat being present. Alcohol is usually a good solvent for this material and you may find it necessary to wash the entire system with alcohol, then after the gummy substance has been dissolved and the alcohol blown out, wash again with carbon tetrachloride and dry in the ordinary manner with a vacuum and heat if possible.

COOLING CREAM

QUESTION 806: A creamery customer of mine proposes to do away with the old brine tanks with which they have been cooling their cream, and install an aerator or surface cooler to be cooled by direct expansion ammonia to do the job. They have for years been cooling the cream from 160 F. to 65 F. or 70 F. with a tubular surface cooler using city water and from there down to the required temperature using brine circulated through the revolving coils of their holding vats. Now they want to reduce the temperature of 3000 lbs. of 30% to 40% cream about 25 degrees in thirty minutes, after it has passed over their water cooler as mentioned above.

They have a 4" x 4" two cylinder ammonia machine which is in good working condition which they propose to use for this work and now we would like to know if this ammonia machine is large enough for the job, and how large a surface cooler they must have. I have installed several direct expansion milk coolers similar to this and they make a real outfit, so I got the idea that it would be all right to cool cream for buttermaking. I have never seen anything like this working and these people are a bit skeptical about it "keeping up." I told them if it would cool one gallon it would cool a thousand gallons, as the temperature should always be the same and not warm up as with brine. On some days they cool as much as 15,000 to 20,000 lbs. of cream in this creamery. As it seems to me, if the condensing unit is big enough to do the job, it is only a matter of getting a surface cooler large enough.

ANSWER: I am a little doubtful that you will meet with success in trying to cool cream over a direct expansion aerator, but anyway here are the figures as close as I can make them, based on certain assumptions. You state that you wish to cool 3,000 lbs. of cream a total of 25 degrees in 30 minutes. The specific heat of 40% cream is about 1.02 which would mean that your machine will have to have a capacity of 3,000x1.02x2x25 which equals 153,000 btu. per hour. This does not take into account the losses which you are bound to have in the aerator, but it is the actual heat content of 3,000 lbs. of cream.

You have not told me the speed at which your ammonia machine is running but from tables we find that a 4x4 ammonia compressor running at a 35 lb. back pressure and 185 lb. head pressure will have a capacity of about 1.8 tons per hundred rpm. In order to carry this load of 153,000 btu. per hour, your machine would have to have a capacity of 13 tons and based on the above figures the 4x4 machine would have to run at a speed of a little over 700 rpm. It is quite possible, if your ammonia machine is of a fairly modern type, that it can run at that speed. However, this seems to be only a part of the difficulty which may make the job a failure.

The great difficulty in cooling cream over an aerator is the adhesion factor. When cooling cream over an aerator, the cream tends to cling to the surface, forming a coating which acts as a very good insulator, retarding cooling. Lowering the temperature of the aerator does not necessarily do any good because it tends to increase the thickness of the cream clinging to the surface. It is quite usual practice to finish the cooling stages of the cream, at least in bulk, by using coil baths or jacketed tanks where the cream can be agitated.

The capacity of the aerator you would require would correspond to the btu. load stated above. A selection should be made on the basis of a 30 degree suction temperature which would be approximately that required in the aerator.

METER MISER FAILS

QUESTION 807: Some time ago I used Herveen replacement gas in a 1935 Frigidaire Meter Miser 1/20 hp. unit. Now the unit, after ten months, is back in the shop with a grounded field—no leaks. Before changing to Herveen I pulled a 29.7" vacuum at approximately 125 F. for one hour on the unit. The field had been rewound with the same type wire—double cotton covered enameled wire. Now for the question. Can you tell me the chemical name and formula for Herveen? My assumption, of course, is that this gas has attacked the insulation of the field winding. The oil was Capella oil and the oil I took out, when compared with fresh oil, had a darker color and felt heavier. I could not compare the insulations because I did not have any of the original winding. The reason I am interested in the formula of this gas is because I am familiar with chemistry.

ANSWER: I am sorry that we cannot supply you with the chemical formula of Herveen. The manufacturers of this gas have never issued any information on it and efforts on our part to obtain it have not been successful.

I don't believe that the gas is the cause of your trouble, since there is little possibility of any reaction between it and the insulation of field windings. Herveen has been used by a large number of servicemen for about seven or eight years and I have never heard of any trouble with field windings due to it.

The dark color of your oil would seem to indicate moisture in the system and it is quite probable that moisture has been there since the original repair work was done. A vacuum of 29.7" during the drying process is a very good vacuum. However, a temperature of 125 degrees for a period of one hour is not sufficient, particularly as a means of getting moisture out of field windings. It is usual practice to run these tem-

A-P SCORES AGAIN

. . IN REFRIGERANT CONTROL ACCURACY

New A-P Model 212 Expansion Valve. Adjustable superheat. Capacities ½ ton, 1-ton, and 1½ tons Freon. Limiting pressures: Freon, 15, 40 and 55 lbs. Market 10

New DEPENDABLE Models 211 and 212 VALVES

Augmenting The Already Complete Line of A-P Dependable Valves

To Be Used Where A Limiting Pressure Feature Is Desirable . . . .

A necessity and money-saving convenience on many modern systems, the new A-P Model 211 and 212 Expansion Valves avoid all those service problems caused by motor overloading [illegible] of motor capacity, they offer advantages never before achieved in a pressure limiting thermostatic expansion valve.

systems, the new A-P Model 211 and 212 Expansion Valves avoid all those service problems caused by motor overloading [illegible] of motor capacity, they offer advantages never before achieved in a pressure limiting thermostatic expansion valve.

Amazingly simple in construction, Models 211 and 212 use only one spring and one needle pin. A unique and entirely new diaphragm unit limits the operating suction pressure to a predetermined setting. Should the pressure build up to a point approaching overload, this diaphragm actuates the needle pin, allowing the valve needle to move towards the closed position, until the overload condition has passed. Then the valve operates in the normal manner to control superheat through the thermostatic bulb and sensitive large-area diaphragm.

Model 211 is non-adjustable. Model 212 is adjustable, and may be used in place of any standard thermostatic expansion valve of similar capacity. It should be installed in any system offering the remotest possibility of overload. Types are available to limit pressures to 15, 40, and 55 lbs. Freon 12; 10 and 30 lbs. Methyl. Capacities: ½, 1 and 1½ tons Freon; ½, 1, and 3 tons Methyl.

See your Refrigeration Equipment Wholesaler for complete details on these valuable new A-P Valves, or write for bulletins.

superheat. Capacities ½ ton, 1 ton, and 1½ tons Freon. Limiting pressures Freon 15, 40 and 55 lbs. Methyl 10
Simple, foolproof design
New A-P Model 211 similar to Model 212 but non-adjustable, designed especially for original equipment.

AUTOMATIC PRODUCTS COMPANY

2454 NORTH THIRTY-SECOND STREET • MILWAUKEE 10, WISCONSIN
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AP Dependable REFRIGERANT VALVES

STOCKED AND SOLD BY GOOD REFRIGERATION EQUIPMENT WHOLESALERS . . . RECOMM

peratures up to 225 to 250 degrees pulling a vacuum on the system about ten hours. In order to get moisture out of the field windings, some companies pass an electric current through the windings during the drying operation, assuring them of warming up at a greater speed.

Judging from the drying methods you have used on this unit and appearance of the oil at the present time, I feel sure your troubles are due to moisture and not to the refrigerant.

AIR CONDITIONING A HOSPITAL

QUESTION 808: On reading the article on air conditioning calculations as described by Edward Dowis in the July issue, I find it just what I need at this time, as I have on hand the calculations for the entire floor for a hospital operating department. I wish to know if the calculations as described, can be used for a job where no recirculated air is used, as this job will be such a one.

Any further information relative to the article will be greatly appreciated and you may be sure I will be anxiously awaiting it. Any comments and pointers you may have relative to the hospital job will be most welcome.

ANSWER: Your letter in reference to my article on air conditioning calculations, which appeared in the July issue of THE REFRIGERATION SERVICE ENGINEER has been referred to me by the editor.

The methods described can be applied to a hospital installation where no recirculated air is used in the operating department, but special attention should be given to the increased amount of outside air to be introduced and to determining the proper amount.

For an installation of this kind I would calculate all, except outside air heat gains by the methods described and determine the amount of air required by the following formula:

$$\text{C.F.M.} = \frac{\text{Sensible Heat (BTU.-Hr.)}}{4.5 \times .241 \times \text{Temperature difference between air delivered by conditioner and that to be maintained in conditioned space}}$$

When all the air handled by the conditioner is outside air, the entire sensible load will be:

$$\text{Sensible BTU.-Hr.} = 4.5 \times .241 \times \text{C.F.M.} \times \text{Temperature difference between outside air and that delivered by conditioner.}$$

The total heat added by outside air will be the difference between the Btu. per pound of air corresponding to the WET BULB temperatures outside and to be maintained inside, or in Btu. per hour

TOTAL HEAT = Reduction (Btu.-Lb.) $\times$ 4.5 $\times$ C.F.M. (Outside air only)

To illustrate, suppose you have calculated a sensible load of 90,000 Btu. Hr. sensible and 30,000 latent, exclusive of outside air load. Outside temperature 105 degrees, inside 85 degrees, air supplied by conditioner 65 degrees dry bulb. Wet bulb, outside 75 degrees, inside 67 degrees.

$$\text{C.M.F.} = \frac{90000}{4.5 \times .241 \times 20} = 4150 \text{ C.F.M. App.}$$

Sensible load will be

$4.5 \times 4150 \times 40 \times .241 = 179{,}280$ Btu. Hr. Sensible (including outside air load)

The heat content per pound of air (TOTAL HEAT) at outside temperature of 75 degrees wet bulb is 37.81 and for 67 wet bulb inside is 31.15: Therefore, the air leaves the conditioned space with 37.81—31.15 Btu. per pound or 6.66 Btu. less than outside air. This represents the total load added by outside air or

$6.66 \times 4.5 \times 4150 = 124{,}375$ Btu. total heat added by outside air.

Summarizing, our totals will be, in Btu. per hour:

	Sensible	Latent	Total
Without outside air	90000	30000	120000
Outside air	y89280	y35095	x124375
Includ. outside air	x179280	y65095	y244375

The values not calculated by formula above, were arrived at by simple addition or subtraction. The ones marked x were derived by working out the formulae and those marked y, by subtraction or addition.

The values for total heat were taken from a table reproduced with an article I wrote in the October, 1946, issue of THE REFRIGERATION SERVICE ENGINEER and referred to in the article which you referred to, or can be gotten from other psychrometric charts or tables.

I am pleased to learn that my article was of interest to you and hope that this supplementary information will be helpful in determining the C.F.M. of air to be supplied for air conditioning as well as refrigeration capacity.—*Edward Dowis.*

DRYING WITH CO_2 AND SHOULD FANS PUSH OR PULL

QUESTION 809: One serviceman claims that he has had success in blowing out a moisture

(Continued on page 74)

STANDARD Stainless Steel EVAPORATORS

MODEL No.	JS-25	JS-422	JS-35	JS-633	JS-45
Trays	1 Single 1 Double	2 Single 2 Double	1 Double 2 Single	4 Single 2 Double	3 Single 1 Double
Cubic Ft. Capacity	4 to 6	8 to 10	5 to 8	10 to 12	9 to 12

SOLD THROUGH LEADING REFRIGERATION WHOLESALERS

Standard Refrigeration Company

20 NORTH WACKER DRIVE ***CHICAGO 6, ILLINOIS***

LOS ANGELES CONTRACTORS ISSUE WARNING TO MEMBERS

The Los Angeles Refrigeration Contractors Association issued a warning bulletin recently on the handling of refrigerant cylinder which we think should be read by all men required to handle compressed refrigerants and other gases in the course of their work. The bulletin in part, follows:

"Death Takes Victim of Ammonia Blast"

THIS is a headline that appeared in the "Los Angeles Times" recently in reporting a fatal accident to a refrigeration service man which was caused by the rupture of an ammonia cylinder while being transported in his automobile from one job to another.

Investigation by the California State Division of Industrial Safety disclosed that the drum, although apparently not overfilled, had been standing in the direct sun for several hours, and doubtless had developed quite a pressure. Also it was being carried inside a sedan with all windows, except the one by the driver's seat, closed thus leaving no way for the escape of the gas when the drum fractured.

The investigation also brought out that the cylinder, while a regular ammonia cylinder had been used as a service drum for some years and had been refilled many times in that period. Markings on the cylinder indicated it had originally been put into use during 1932 and in the succeeding 15 years had only been retested once, and that early in 1939 which was more than 8 years before the fatal accident.

It is a requirement of both ICC regulations and State Safety Laws that cylinders used to handle, store or transport compressed gases of all types must be properly tested and marked within a period of 5 years prior to such use. Therefore, not only is it a violation of ICC regulations to ship by public carrier a full or partially full drum that does not have an ICC test stamp less than 5 years old, but it is also a violation of the law to use any such cylinder.

Any accident caused by a cylinder not carrying evidence of an ICC test within 5 years may lead to serious charges of negligence and the person responsible may be liable for costly damages.

Therefore, we urge each and every one to carefully inspect all refrigerant and other compressed gas cylinders in your possession immediately. If the latest ICC test date stamped on the drum is 5 years or more old then either return the cylinder to the manufacturer for credit or exchange, or have it retested locally without delay.

In addition to the necessity of using only drums that have been tested and approved within a five year period there are two other important points that should always be kept in mind when handling refrigerants.

The first is to never fill a drum beyond its rated capacity. When filling a drum never guess how much is in it, but put it on a scale and weigh it. When a cylinder is overfilled the expansion space is not there and a very real danger of a cylinder rupturing exists. There have been a number of such explosions during recent years, several resulting in deaths and serious injuries to say nothing of large property damage.

The second is to avoid the use of a flame from a torch as an aid in emptying a drum. This is a practice that is entirely too common for comfort. It is extremely dangerous and all workmen should be warned of the hazard and damage that can result from this. Along this line too the flame of a torch should never be used to heat any vessel or part of a system containing refrigerant. This is simply asking for trouble.

DON'T use a refrigerant drum unless it is stamped with an ICC test date within five years.

DON'T let a refrigerant drum stand in the direct sun, particularly on a hot day.

DON'T carry a drum in a closed car without adequate ventilation.

DON'T fill a drum beyond its rated capacity.

DON'T turn a flame on any refrigerant containing drum or part of a system.

S S S

N.A.R.C. REPORTS ON LICENSING

PROGRESS is being made toward a suggested model licensing regulation for cities or states by a special committee of the National Association of Refrigeration Contractors of which A. C. Ellerbusch, Detroit, is chairman, according to a bulletin issued by the association.

N.A.R.C.'s recent survey of 132 representative cities showed that only 6% have a licensing regulation to assure that refrigeration installations and service work is performed by qualified refrigeration contractors.

Checks have indicated, also, that considerable work is being performed "on the side"

DFN *takes the guesswork out of* DEHYDRATION!

DFN Baking . . . Testing . . . Sealing methods . . . assure 100% drying efficiency . . . provide greater drying capacity

YOU'D think it is enough that DFN Dehydrators incorporate the exclusive DFN drying-filtering design—use the finest copper tubing, brass fittings, drying agents, brazing techniques and manufacturing methods. But as specialists in scientific drying, we go much further, to assure 100% drying efficiency.

Every DFN Dehydrator is tested to 300-lb. pressure—baked at 300° F. for 3 to 4 hours (according to drying agent used) in controlled-temperature ovens to remove every trace of adsorbed moisture—then immediately sealed to preserve full strength dehydration until used. DFN Cartridges, after baking, are hermetically sealed in new moistureproof, metal-end containers.

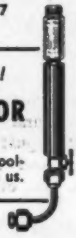
Buy DFN Dehydrators from your wholesaler. Write for Catalog R-7

Don't guess if system is wet or dry!

DFN MOISTURE INDICATOR

tells quickly, accurately on the job.

For Freon and Methyl Chloride. Easy, foolproof, inexpensive. See wholesaler or write us.



McIntire Connector Co., 255 Jefferson St., Newark 5, N. J.

Only the **DFN SYSTEM** **DEHYDRATES FILTERS NEUTRALIZES**

DEHYDRATORS • STRAINERS FILTERS • NEUTRALIZERS

by mechanics with little or no responsibility for the welfare of users, as well as the safety from personal and property hazards incident to installations and service.

Inquiries from many cities show a keen interest among refrigeration contractors in licensing; so N.A.R.C. hopes to bring forth a suggested regulation that will fill the bill.

One of the controversial points encountered was whether or not mechanics should be licensed, as well as refrigeration contractors.

The N.A.R.C. committee finally reached the decision to recommend that only refrigeration contractors be licensed. This will make a more clean-cut, simple and effective regulation. It will confine things to contractors who, after all, have in their hands the sole responsibility for proper work; and it will make for a better and more impartial examining board with less tendency to inject politics into the picture on licensing and inspections. Further, it will decrease the tendency of mechanics to do work "on the side," thus competing, in a back-handed, underhanded way, with their own employers, disrupting the market to some extent, and doing work that so often is not satisfactory nor safe, with a guarantee that means nothing.

The suggested regulations will also provide for a competent Examining Board, Inspection Department, permits for work, and bonding of refrigeration contractors.

S S S

AIR CONDITIONING APPLICATION SIMPLIFIED IN NEW STANDARDS

AIR Conditioning contractors and sales engineers, as well as buyers and buyers' representatives, will welcome the Application Engineering Standards For Air Conditioning For Comfort just published by the Air Conditinoning and Refrigerating Machinery Association, Inc., of Washington, D. C.

Prepared primarily as "recommended practice" for ACRMA members, comprising principal equipment manufacturers, this sixteen-page, 8½"x11" booklet incorporates text and tables covering design load factors, design outside and inside conditions, sunlight radiation through glass, ventilation and infiltration, design occupancy, heat gain from occupants and appliances, transmission coefficients, air distribution, and capacity specifications. The section on load calculations provides a simplified cooling load calculation form. Also included is a section on heating loads, with a short form for heating load calculations.

In a foreword, the Association states: "These recommended standards were designed not to supplant, but rather to supplement, individual company practice and data prepared and published by technical societies. In compiling these recommended standards, the members of ACRMA used as bases not only authoritative published material and generally-accepted industry practice, but also their own practical experience in the application of the industry's products."

This new publication is priced at $1.00, with a schedule of discounts for quantity purchases.

S S S

BOOK REVIEW

AIR CONDITIONING, by Herbert Herkimer and Harold Herkimer. 692 pages, cloth bound. Price $12.00. Published by Chemical Publishing Co. For sale by Nickerson & Collins Co., 433 N. Waller Ave., Chicago 44, Illinois.

The control of atmospheric conditions is of vital importance in a great many industrial fields. Over 200 different industries are offered in this book as a partial list of those in which the advantages of air conditioning have been recognized and used.

Here is an indispensable book for engineers and other workers engaged in this ever-growing industry. The object of the book is to provide all the required information on every phase of air conditioning, e.g., estimation, sales, production, installation, supervision, service, etc. It reviews the laws of chemistry and physics associated with air conditioning, and then goes on to the practical aspects of the industry, such as equipment, materials and costs.

The subject matter has been carefully selected to give well-balanced and systematic training to students of air conditioning engineering, and to help engineers and other technical men to solve their problems in designing and repairing equipment, selecting materials and estimating costs. The book is replete with problems and their solutions, tables and illustrations.

S S S

VAST new horizons of speeds and accuracy, which industrial research has made possible by development of more versatile metals, more efficient lubricants and better types of anti-friction bearings, not only mean record speeds for machinery but also more goods for more people at lower cost.

ENGINEERED
to fit..
FORGED FLARE NUTS
AND FITTINGS
Prompt Shipment on most items
Electrimatic
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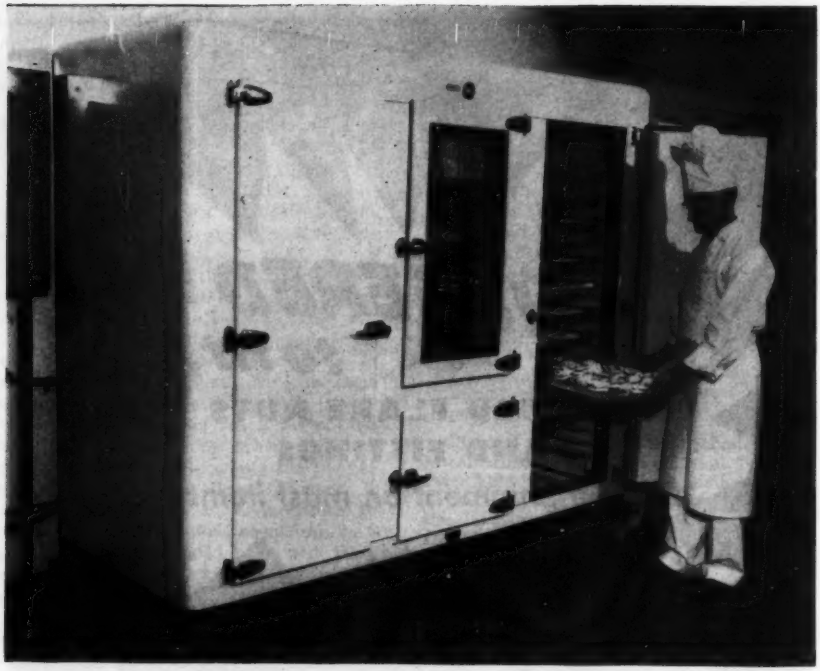


Fritz Nickel, who recently opened a pastry shop at 2016 Pacific Avenue in Long Beach, Calif., is shown at his new Tyler Dough Retarding box.

THIS IS A MODERN BAKERY

IF YOU have any doubts about the modern age being upon us, then take a peek at Fritz Nickel's new pastry shop at 2016 Pacific Avenue in Long Beach, California.

Nickel, former head baker for the Hilton Hotel in Long Beach, has utilized the most recent advances in refrigeration science to make his shop one of the most beautiful in Southern California.

Twenty-five years of baking experience has taught Nickel that one of the most important aids to good baking is good refrigeration.

To help him maintain the fine standards of quality he established with the Hilton Hotel, Nickel purchased a Tyler Dough Retarding box from Perfecold Refrigeration Company of Long Beach. J. B. (Jack) Brown was the Perfecold sales engineer who supervised installation.

With his new Tyler box, Nickel has found that he is able to store large quantities of dough, pastries, pies and cakes without fear of spoilage. Nickel reports that the Tyler case has cut down his night work and simplified his production schedule.

To add to the attractiveness of his shop, Nickel had an artist paint a series of vividly-colored cartoon sketches of miniature bakers along the walls of the sales department. The comic characters depict all phases of baking.

Nickel's background in baking is wide and varied. During the war he trained bakers for the U. S. Maritime Service, and at present, he is chief bakery instructor for the Long Beach Board of Education.

* * *

SOME 8,000 frozen food locker plants now serve 13 million persons in farm or rural areas, according to the Department of Agriculture. In 1943, the number of locker plants was only 4,600, and various estimates put the future increase at as high as 4,000 per year, or a total of around 20,000 by 1950.

Refrigeration industry leaders look for their biggest increases in the direction of enlargements to present plants.

SOUTH BEND LATHES

SPEED UP SERVICE WORK

Prompt service work builds profitable business — and South Bend Lathes are indispensable in speeding-up repairs. With them, many parts can be made quickly, economically, and to original factory tolerances. Worn parts can often be reconditioned to give additional service. You will also find that the accuracy of South Bend Lathes contributes to better workmanship.

Prices start at $145.00, f. o. b. factory. Time payment terms of 25% down, with balance due in 12 monthly payments are available. Prompt delivery can be made by your local distributor or direct from factory. Write for catalog — specify size lathe in which interested: 9", 10", 13", 14½", 16", or 16/24" swing.

10" Regular Quick Change Bench Lathe — with bench. 3-1/2' bed — 11/16" collet capacity **$804**

f. o. b. factory, less electrical equipment.

SOUTH BEND LATHE WORKS

529 E. Madison St., South Bend 22, Ind. • *Building Better Lathes Since 1906*

NEWS and ACTIVITIES

Announcements of the activities and educational work of the International Socicty and Local Chapters appear in this department.

COMING CONVENTIONS

Alabama Association
Place: Admiral Semmes Hotel
City: Mobile, Alabama
Date: October 17, 18
Chairman: T. O. Cooper, Harris Supply Co., Mobile, Ala.

Illinois State Meeting
Place: Baker Hotel
City: St. Charles, Ill.
Date: November 1, 2
Secretary: R. E. Saunders, 730 Towanda Ave., Bloomington, Ill.

New England States Association
Place: Bond Hotel
City: Hartford, Conn.
Date: November 9
Secretary: Lee J. Wallace, 29 Cave Street., New Haven, Conn.

RSES Annual Convention
Place: Hollenden Hotel
City: Cleveland, Ohio
Date: Jan. 21, 22, 23, 24, 1948
Secretary: H. T. McDermott, 433 N. Waller Ave., Chicago 44, Ill.

R.E.M.A.—All-Industry Exposition
Place: Cleveland Public Auditorium
City: Cleveland, Ohio
Date: January 26-29, incl., 1948
Secretary: R. Kennedy Hanson, 1107 Clark Bldg., Pittsburgh, Pennsylvania

Interprovincial Association
Place: King Edward Hotel
City: Toronto, Ont.
Date: March, 1948. Dates to be announced later.
Secretary: E. G. McCracken, 215 Laird Drive, Leaside, Ontario.

California State Association
Place: Palace Hotel
City: San Francisco, Calif.
Date: April 30, May 1 and 2
Chairman: David Fagg, 1951 E. 14th St., Oakland, California

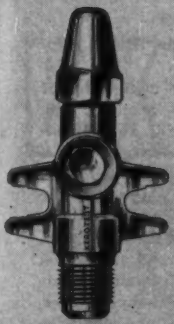
MAKE YOUR HOTEL RESERVATION FOR CONVENTION EARLY

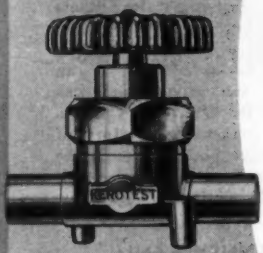
RSES members have received through the mail from the Secretary's office, reservation cards for accommodations at The Hollenden Hotel for the 10th Annual Convention, January 21-24, 1948.

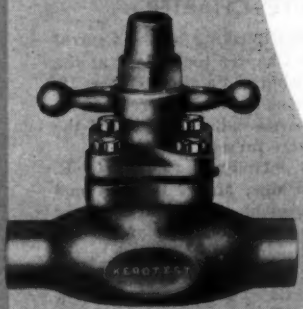
Every effort is being made this year to house members with the least possible delay and disappointment. Hotel space in most cities is still "tight" and unless reservations are made a sufficient time in advance the hotels will be oversold.

In order to insure accommodations, all reservations should be made not later than November 1. Reservations received after that date may be referred to the Housing Committee of the Cleveland Convention and Tourist Bureau, but no assurance can be given that hotel space will be available.

Confirmation of reservation will be sent direct from the hotel.

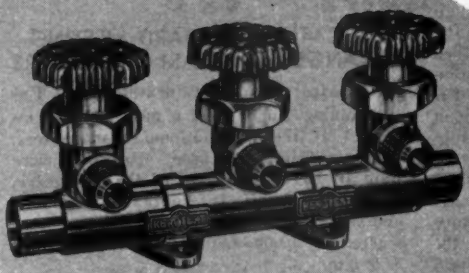


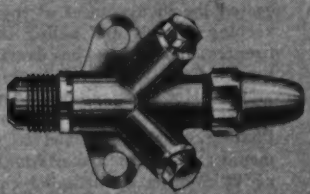




HERE ARE THE NEW KEROTEST VALVES YOU ASKED FOR . .

Your demand has been our command . . . and here are five of the new KEROTEST Valves that will give you still more of the characteristics you look for most in valves. More compactness . . . greater ease of installation . . . fuller efficiency . . . and greater dependability and service than ever . . . with economy. For the finest and newest in refrigeration and air conditioning valves . . . see your KEROTEST Wholesaler.





See your KEROTEST *Wholesaler*

AMERICA'S FIRST NAME IN QUALITY VALVES

KEROTEST MANUFACTURING CO.
PITTSBURGH, PA.

DATES FOR 2ND CARSES MEETING AND EXHIBITION SET

PLANS for the 2nd Annual Convention of the California Association of the RSES to be held in conjunction with the Western Refrigeration Educational Exhibit were fully discussed at the Board of Directors meeting held in Santa Cruz on September 6 and 7.

San Francisco has been selected for the meeting which will be held on April 30, May 1 and 2, 1948. Official headquarters will be the Palace Hotel.

Floor plans for exhibit space are being prepared and the meetings and exhibit will be held under one roof in the hotel.

Committee Members

General Chairman: David Fogg, Palace Hotel, San Francisco, Calif. Entertainment and Arrangements: Rowland F. Cooke, 1753 47th Ave., San Francisco, Calif. Contracts: M. B. Willis, 1545 Hampshire Street, San Francisco, Calif. Publicity: Chas. L. Rusten, 1304 Lombard St., San Francisco, Calif.

Golden Gate Chapter, of which Chas. L. Rusten is President, will be hosts to the convention.

KANKAKEE VALLEY ADOPTS CONSTITUTION AND BY-LAWS

ON SEPTEMBER 16 the members of Kankakee Valley Chapter met to complete their organization work and elect permanent officers. The meeting started with a dinner enjoyed by 13 members and 7 guests coming from the Tri-County and Chicago Chapters.

Immediately following the dinner, James O'Connor asked Willis Stafford of the Herman Goldberg Company to assist as Master of Ceremonies. The first order of business was the final reading of the proposed Constitution and By-Laws which were adopted with minor changes. Mr. Stafford then called on Bert Clark, Illinois Association New Chapters Committeeman, who discussed the many duties of the Secretary in keeping records and aiding the chapter to progress. Mr. Clark has been Secretary to the Tri-County Chapter for many years.

Wm. McCarley, Illinois Association 2nd Vice-President and member of Tri-County Chapter, was then asked to enlighten the members on the Association's plans and activities whereby affiliated chapters would be benefited. He brought out the plans for speakers at chapter meetings and the various training programs that the State Association has started this year.

Election of officers was the next order of business with the following results: Ben. Hursh, *President;* Wm. Ward, *Vice-President;* James O'Connor, *Secretary-Treasurer;* Franklin Dupuis, *Sergeant-at-Arms;* Wm. Sterns, *Educational Chairman.* The Board of Directors elected were: Fred Rattunde, Arshall Marquott and Elmer Tatro. Following the election, Wm. McCarley took charge of installing the officers and obligating them to faithfully perform their duties. When President Hursh took the chair he called for discussion on joining the Illinois Association. After careful consideration the members voted to affiliate.

Not overlooking the importance of an educational feature, the group then was introduced to Felix R. Wierman, Chicago Seal Company, who presented the story of Chicago seals and valve plates through the use of large charts and cut-away pieces of the products under discussion.

CENTRAL PENNSYLVANIA RECEIVES CHARTER

THE first official meeting of the Central Pennsylvania Chapter took place at the Y.M.C.A., Harrisburg, Pa., September 18. Of the 81 charter members, 54 were present. The sergeant-at-arms called the roll of the officers and all were present.

The Secretary introduced Charles C. E. Harris of Cambridge, Mass., International Second Vice-President. Mr. Harris spoke on the merits, objects and aims of the Society, urging all members to live up to the pledge which he gave to the group present. He extended words of welcome to the new chapter and members, and presented the charter to President Harper Kelley.

EDUCATIONAL BOARD MEETING ARRANGES PROGRAM OF SPEAKERS

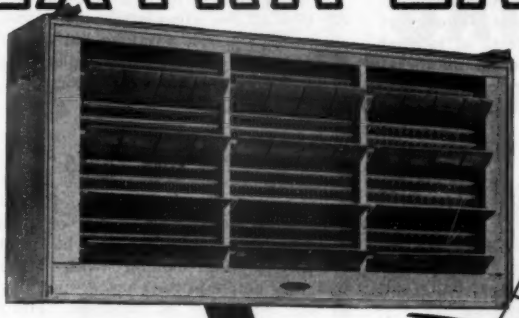
THE International Educational and Examining Board held a meeting September 14 at the International headquarters, Chicago, Illinois. Those attending were Paul B. Reed, Chairman of the committee, H. T. McDermott, International Secretary, and six members of the Board. The meeting started at 10:00 a.m. and continued until 5.00 p.m.

Discussions during the morning period centered around the RSES educational program and the All Makes Perpetual Service

EXTRA LARGE

Capacities

NOW AVAILABLE



UNIT No. 720
55,000 B.T.U. Per Hr.

159	6840	7180
212	7950	9900
285	10800	11900
360	13250	15900
480	18000	19900
720	24000	27000
	36500	36000
		54750

WIDE RANGE OF SIZES

COOLMASTER

by KRAMER

Many new improvements have been added to the COOLMASTER — a proven superior line of Product Coolers (for 36° F. Range.)

Write for Bulletin R-125

KRAMER TRENTON CO. *Trenton, N. J.*

Manual in particular. Sections were assigned to various members of the committee and reports were received on progress to date on sections previously assigned.

After lunch the discussion turned to the educational program for the National Convention to be held in Cleveland, January 21 to 24, inclusive. Eight subjects of interest to the membership were selected and speakers assigned to present papers on them. Announcement of these subjects and their speakers will be made at a later date.

21 WAYS TO KILL ORGANIZATIONS
RSES Members Excepted?

1. Don't come to the meetings.
2. But if you do come, come late.
3. If you do attend a meeting, find fault with the work of the officers.
4. Never accept an office, as it is easier to criticize than to do things.
5. Nevertheless, get sore if you are not appointed on a committee, but if you are, do not attend committee meetings.
6. If asked by the chairman to give your opinion regarding some important matter, tell him you have nothing to say; after the meeting tell everyone how things ought to be done.
7. Do nothing more than absolutely necessary; but when other members roll up their sleeves and willingly and unselfishly use their ability to help matters along, howl that the organization is run by a clique.
8. When a banquet is given, tell everybody money is being wasted on blowouts which make a big noise and accomplish nothing.
9. When no banquets are given, say the organization is dead and needs a can tied to it.
10. Don't make reservations, then yell if you don't get fed.
11. If you are asked to sit at the speakers table, modestly refuse.
12. If you are not asked, resign from the organization.
13. If you receive a bill for your membership, don't pay.
14. Keep your eye open for something wrong, and when you find it, resign.
15. At every opportunity threaten to resign and then get your friends to resign.
16. When you attend a meeting, vote to do something and then go home and do the opposite.
17. Agree to everything said at the meeting and disagree with it outside.
18. When asked for information, don't give it.
19. Cuss the organization for the incompleteness of its information.
20. Get all the organization gives you, but don't give it anything but H——.
21. When everything else fails, cuss the Secretary and the President.

A. C. BAIRD DIES

THE Shreveport Chapter, Shreveport, La., is mourning the loss of their 1st Vice-President, A. C. Baird, who was killed recently in an airplane accident. Mr. Baird was very active in the chapter and was held in high esteem by its members. His death is keenly felt by his many friends and admirers.

THOMAS COATES DIES

OFFICERS of the North Montana Chapter report the loss of one of their members, Thomas Coates of Deer Lodge, Montana, who died September 15. He was born in Iowa, July 4, 1885. He has operated his own business in Deer Lodge for the past five years.

REFRIGERATION SERVICE ENGINEERS SOCIETY
HOTEL HOLLENDEN · JAN. 21,22,23,24

SAFE

AS IF SEALED IN GLASS

—WITH MARLO SPRAY UNITS

Perishable foods are perfectly preserved this modern Marlo way. These advanced Spray Coolers provide triple-safe protection against all three major hazards:

AIR-BORNE BACTERIAL INFECTIONS—Marlo Brine Spray Units retard the growth of molds, spores and fungi by washing the air antiseptically clean.

HEAT SPOILAGE—these efficient units always keep the temperature well below the danger point.

DRY-AIR SHRINKAGE—they hold the humidity exactly where you want it to prevent loss of volume and freshness that shrinks your profits.

Built in a full range of sizes—also Dry Coil and All Prime Wet Surface types. Write for Bulletin 403

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MARLO COIL COMPANY

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Chapter Notes

• ARROWHEAD CHAPTER, *Riverside, Calif., Aug. 11*—President Kaeding called the meeting to order which was held in the American Legion Hall, Colton, Calif. After some time spent in business matters, the meeting was turned over to Mr. Ricker, Chairman of the Educational Committee. Mr. Ricker introduced Messrs. R. H. Trimomer, E. E. Perso, C. O. Brown, R. B. Long and L. J. Laiser from the Texas Oil Co. These gentlemen in turn provided a very interesting illustrated lecture on types of oils and their refining. A recess was called following the educational program, during which refreshments were enjoyed. Other visitors present for the evening were T. R. Schumacher of Corona, James Ritz of the Golden State Company, A. A. Hull of Beaumont and Tom Renzi, Van's Supply, Long Beach. A total of 28 members and 9 guests were present.

• BIRMINGHAM CHAPTER, *Birmingham, Ala., Sept. 13*—Members of the chapter enjoyed the annual barbecue to such an extent last month that it was decided to hold another. A second barbecue held on this date at Tapawingo proved to be an equal success. Dancing, pitching horseshoes, swimming and various other sports were enjoyed by the members and their families.

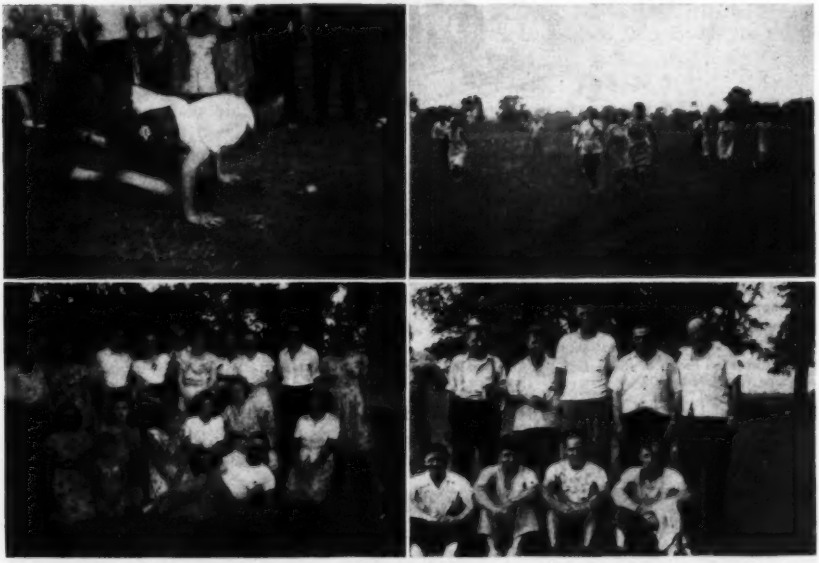
• BOSTON CHAPTER, *Boston, Mass., Sept. 9*—Charles Galli, Chairman of the Educational Committee, introduced Norman Hornecker of the A. E. Borden Co. Mr. Hornecker gave an interesting talk on refrigeration which proved educational to all. Three new active members and one new junior member were accepted to membership, and Charles Harris reported on the forthcoming International Board of Directors meeting to be held in Chicago. He also gave an outline of the plans behind the International Educational program.

• CENTRAL NEW YORK CHAPTER, *Syracuse, N. Y., Sept. 9*—President C. L. Bailey called the meeting to order at the Eastwood Sport's Center. Louis Liberati and Gordon Johnson were appointed as Publicity Committee. On the educational program a discussion arose on the changing of one refrigerant to another in different types of equipment.

• CHARLESTON CHAPTER, *Charleston, W. Va., July 8*—The annual election of officers was held at this meeting with the following results: Harry G. Frame, *President;* L. C. Black, *1st Vice President,* E. P. Whisenhunt, *2nd Vice President;* W. P. Miller, *Secretary;* Joe W. Price, *Treasurer;* George E. Hopkins, *Sergeant-at-Arms.* Board of Directors—L. C. Black, E. E. Sigmon, C. A. Wiley and R. H. Amick.

The August 12th meeting was held in the business headquarters of Mr. Frame. Thirteen members were present and Robert Patton of Woodrum's Home Furnishings was a visitor for the evening. Mr. Frame led the discussion arising from questions and answers in the absence of Robert G. Bushea.

• CHICAGO CHAPTER, *Chicago, Ill., Sept. 9*—This meeting was held in the offices of



These four views taken at the Chicago chapter picnic show. Top, left, egg-rolling race; top right, egg-in-spoon and spoon-in-mouth race; bottom, left, employes of Accurate Refrigeration Co. who attended; bottom, right, south side ball team who played the north siders.

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Liquid Carbonic Corporation, and the business session preceding the main event was purposely cut brief in order to give more time to the educational program. Frank Frazee, Chairman of the Educational Committee, introduced John Praetz, Director of Service and Sales Engineering of Liquid Carbonic Corp. Mr. Praetz in turn introduced Mr. Palmer who gave an interesting talk on ice cream cabinets, illustrated with slides. Mr. Praetz then introduced Mr. Merryman who talked on soda fountains. The meeting was then thrown open to discussion on the two talks just given and on service problems pertaining to ice cream cabinets and soda fountains. Literature on the entire line of Liquid fountains and cabinets was provided each member present.

• CORPUS CHRISTI CHAPTER, *Corpus Christi, Texas, Aug. 12*—The meeting was held at the United Refrigeration Co. in Corpus Christi. An election was held to fill the office of Sergeant-at-Arms and after several nominations were received and a vote taken, B. W. Johnson was elected. Other officers of the chapter are: Wallace Lindeman, *President;* Jack Ladwig, *Vice-President*, C. W. Neisel, *Secretary* and A. J. Edwards, *Chairman.* It was reported that A. J. Edwards was sick and unable to attend meetings. A letter of condolence was sent by the chapter hoping for Mr. Edward's speedy recovery.

• DIRIGO CHAPTER, *Lewiston, Me., Aug. 10*—A chapter outing combined with a business meeting was held at Spruce Head, and one of the cottages served as the meeting place during the day. New members accepted were Donald E. Smith, Alfred H. Pence, John E. Bradley, Albert H. Freeman and Albert J. Reed. A good attendance of members and their families came during the day. Lobsters were obtainable at Simms Lobster Pond on the grounds and were enjoyed by all. Group pictures were taken and a general good time was the order of the day. Many suggestions were made to make this date and place an annual event for which thanks is due to Carroll Merrill of Rockland.

At the September 9th meeting the educational program was devoted to the problems of the members that had developed during the summer months. It proved to be a very interesting session lasting more than two hours with everyone present taking part. One of the most interesting subjects was methods of cleaning condensers and the most popular method seemed to be blowing out the condenser with CO_2. Some members reported problems involving moisture in ice cream cabinets and freezers and discussion arose on ways of overcoming this trouble.

• ELM CITY CHAPTER, *New Haven, Conn., Sept. 5*—Committees appointed during the business session included the following: Sick Committee, Edward Morley; Educational Committee, Ralph Rice; Membership Committee, William Mongillo; By-Laws Committee, George Biggs; Publicity Committee, William Pencava; Entertainment Committee, Frank Morgan; Ways and Means Committee, Charles Smith; and Refreshments Committee, Wallace Pazik. On the educational program a question and answer period was held with the recent certificate examination questions forming the basis of discussion.

• FURNITURE CITY CHAPTER, *Grand Rapids, Mich., Aug. 5*—Two representatives of the Wolverine Tube Co., Roy Annis and Edward Campbell, were guests of the evening. They gave a talk, illustrated with slides, on the making of copper tubing from the raw product taken from the mine to the finished tubing. Dan Gott of Detroit Lubricator introduced Mr. Paxton, his successor as representative of the territory. Dan is being transferred to a new assignment with the company.

At the September 9th meeting Messrs. John Shenk and Roy McCready of the Alco Valve Co., presented a demonstration illustrated with slides on the operation of their valves and other controls. A glass evaporator was used in the final part of the program which showed how refrigerant and oil behaves in the system.

• GOLDEN GATE CHAPTER, *San Francisco, Calif., Aug. 26*—Approximately 30 members attended the meeting to see Clay Snider of the Minneapolis-Honeywell Regulator Co., aided by Webb Schmelling, present four reels of sound movies in color. Reels one and two were on basic electricity, and three and four on the adaption of moduflow to the C-I auto pilot used during the war on large bombing planes. This was followed by slides showing wiring diagrams of M-H air conditioning controls. It was an outstanding educational program and refreshments were served following the movies.

• HEAD OF THE LAKES CHAPTER, *Duluth, Minn., July 25*—This was a special meeting called for the purpose of seeing a demonstration of the Thermobank system by Kramer-Trenton Company. Slides and a portable working model of the system were used in the demonstration.

At the August 4th meeting, Mr. Shanc of the Alco Valve Company and Mr. Coleman of the General Electric Company combined their efforts in giving a very interesting lecture illustrated with colored slides on Alco valves and General Electric compressors.

• HOUSTON CHAPTER, *Houston, Texas, Sept. 9*—At the suggestion of Ed Smith it was decided that chapter members could list surplus equipment they wish to dispose of in the chapter meeting notices. A limit of three items for each member could be placed on the bulletin at no cost to the member. K. M. Daniels, organizer of the bowling league, told of the interest created and the good fellowship and fun enjoyed by the team. He promised to get the bowlers to attend more regularly the monthly chapter meetings.

• INDIANAPOLIS CHAPTER, *Indianapolis, Ind., Aug. 26*—This was a special meeting held for the purpose of hearing Messrs. Weber and Smiley of Nash-Kelvinator present a most vivid picture of their water cooler and its foolproof construction. They brought with them a cut-away model to show the features incorporated in its construction. This was very educational to those present who had never seen the water cooler proper and did not have a clear picture of how it worked.

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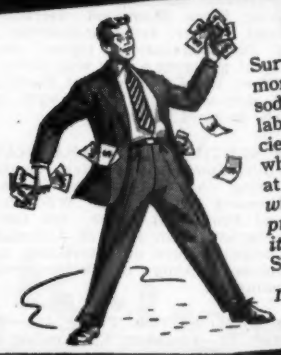

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Originators of Instantaneous 80° 40° *Liquid Cooling Devices*

45 PIQUETTE AVENUE DETROIT 2, MICHIGAN

The chapter reports with deep regret that they lost two well known and active members. John T. Bunton passed away suddenly on his way to his new home in California, after visiting in Indianapolis for several weeks.

Dave Gerrard, who had been incapacitated for some time by the loss of his limbs, died at his home in Indianapolis. These two men will always be remembered by their friends for the part they played in Indianapolis in the growth of the Refrigeration Servicemen's organization.

• JOPLIN CHAPTER, *Joplin, Mo., Sept. 10*—Announcement was made that the Mueller Brass Company was planning a demonstration for the chapter at a forthcoming meeting, dates to be announced later. One of the series of films, No. 447 on Quieting a Noisy Refrigerator, provided the educational program for the evening. Slides were shown following the movie and a discussion conducted on the methods presented.

• KEY CITY CHAPTER, *Dubuque, Iowa, Sept. 3*—A report on alley parking for servicemen was given by T. H. Glass. The application for membership of Erwin A. Schumacher was accepted. For the educational program a short discussion was held on practices of selling to retail trade at wholesale prices, certain types of refrigeration equipment.

• LOS ANGELES CHAPTER, *Los Angeles, Calif., Aug. 27*—It was planned that this should be rather an informal meeting so that some business could be conducted. Ed Nelson, of Union Ice Co., was the speaker of the evening—his subject being a trip through Old Mexico. He related his experiences during a trip made about a year ago. These experiences ran the complete gauntlet of emotions from humor through pathos and included politics and economics. During the course of his talk he showed some very interesting colored pictures. These pictures were so arranged to illustrate the points of the talk as Mr. Nelson related them. The meeting subject could be highly recommended for many of the Southern California chapters. Principal business conducted was in the nature of laying plans for the cooperation of Los Angeles Chapter with the other Southern California Chapters towards a Society picnic to be held in Orange County. Forty-five members and guests attended the meeting.

• MIAMI CHAPTER, *Miami, Fla., Aug. 13*—President Dick Turpin announced his appointment of committees and their personnel. They are as follows: Legal Affairs: Chairman, J. D. Nall, Messrs. Arthur Bizzell, K. R. Brand, Judson Harris and Orville Brown. Membership: Chairman, Cecil Sturgis, Messrs. Norse Harwood, Harold Wright and Al DeBosser. Educational: Chairman, Al Runyon, Messrs. H. V. Flood, Paul Connally, Orville Brown and T. McGuire. Program: Chairman, Dick Turpin—others to be selected. Standards: Chairman, J. Harris, Messrs. Frank Leach, P. E. Ritchie, E. A. Runyon. J. D. Nall reviewed sections of the city code sponsored by the chapter, and read recent revisions applied to it. On the educational program a discussion of questions submitted to the question box contributed to a very lively session.

• MIDLAND EMPIRE CHAPTER, *Billings, Mont., Sept. 9*—Meetings of the chapter were resumed after two months summer adjournment, and on the educational program of this first gathering of the Fall and Winter season, John Hall of the Automatic Products Co., Milwaukee, Wis., gave a fine presentation of facts and pictures concerning the products they make. The attendance was 24, 11 of whom were out of town members and guests. Refreshments were served after Mr. Hall's presentation.

• MILE HIGH CHAPTER, *Denver, Colo., Sept. 9*—Leslie Goodson of the Ultra Violet Products Co. Inc., of Los Angeles, was the guest speaker for the evening. He opened his talk by explaining light rays, and through diagrams showed how the ultra violet rays were produced. He then explained why every butcher shop should have ultra violet lamps in his walk-in cooler. Mr. Goodson, using a sample lamp, demonstrated how it should be hung and proper positioning.

• MONUMENTAL CHAPTER, *Baltimore, Md., Sept. 9*—Jerry Scherr informed the chapter that the electrical code is being modified and would include refrigeration electrical work. It was suggested that a committee be appointed to work with him on the code. Frank Carter, Sales Engineer of the Detroit Lubricator Company, gave an interesting talk on expansion valves and their proper installation. He wound up his discussion with a few humorous details.

• NEW BRUNSWICK CHAPTER, *St. John, N. B., June 7*—New officers for the coming year were elected at this meeting. They are: Norman Tait, *President;* Ted Andow, *1st Vice-President;* Sterling Barrett, *2nd Vice-President;* Steve Sherwood, *Secretary-Treasurer;* Fred Walker, *Sergeant-at-Arms;* and Gordon Y. Dow, *Educational Officer.* On the educational program a talk was given by James S. Bauer, Chief Engineer of Electrical Division. A sing-song and dance with refreshments was enjoyed in the evening.

• NORTHERN MONTANA CHAPTER, *Great Falls, Mont., Sept. 8*—New members accepted during the evening were Tom R. Young, Leonard Ritzschke, Al Wild, John Kelleher and Francis B. Olson. On the educational program, John Hall of Automatic Products Company, gave an interesting discussion on valves, strainers and other products of the company.

• OIL CAPITOL CHAPTER, *Tulsa, Okla., Aug. 20*—President Epps called for questions on servicing Crosley refrigerators and Mr. McKee provided the answers. Mr. Epps then gave a talk on replacement units for the Otasco refrigerator, manufactured by the Oklahoma Tire & Supply Co.

• ONTARIO MAPLE LEAF CHAPTER, *Toronto, Ont., Aug. 13*—This was an executives' meeting devoted entirely to business of

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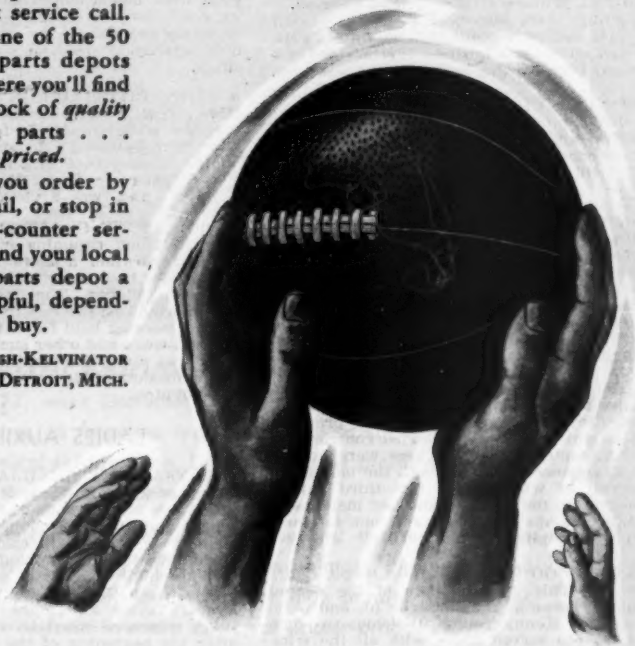
Whether you order by phone or mail, or stop in for over-the-counter service, you'll find your local Kelvinator parts depot a friendly, helpful, dependable place to buy.

DIVISION OF NASH-KELVINATOR CORPORATION, DETROIT, MICH.



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CONDENSING UNITS
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the chapter. J. V. Reynolds, Chairman of the Welfare Committee presented a brief of recommendations, and in the absence of Mr. Doan, R. G. Henderson reported for the Educational Committee outlining a list of guest speakers for the coming season. So crowded is the schedule that it is recommended that Mr. Henderson try to obtain additional meeting nights during the year so that it will be possible to hold strictly educational showings of films that are available.

• SACRAMENTO VALLEY CHAPTER, *Sacramento, Calif., June 5*—Officers elected at this meeting are Al Schoen, *President;* Arthur Weaver, *1st Vice-President;* Frank Hoffman, *2nd Vice-President;* Clifford Stewart, *Secretary;* Charles Colard, *Treasurer;* Don Gordon, *Sergeant-at-Arms;* and A. M. MacLennan, *Educational Chairman.* Board of Directors—John Bell, Wilbern Griffin, Rodger Gleason.

Meetings were also held July 3rd, August 7th and September 4th, all of which were devoted entirely to business matters and discussions affecting the welfare of the members.

• ST. LOUIS CHAPTER, *St. Louis, Mo., Aug. 23*—In lieu of a meeting on this date the members and their wives and guests enjoyed a barbecue at the home of Vice-President Sam Wolff and his wife, Roberta. In spite of the near 100 degree temperature that day, the evening proved comfortable enough to enjoy to the fullest the events that had been planned. Each of the ladies brought a covered dish or cake and the ribs, beer, soda, ice cream, etc. were provided by the chapter. President Roland Vizgird, Sam Wolff, Joe Pedrotti and Nip Moeller shared the hot job of barbecuing. Ted Rumpf also worked diligently the greater part of the afternoon stringing the lights. There was recorded music over a P.A. system and later excellent entertainment by May Levy, including community singing, was a highlight of the evening. Several games of chance provided amusement as well as an added contribution to the chapter treasury. There were numerous attendance prizes for both the ladies and men, all of which made this third annual barbecue of the chapter another memorable evening, thanks to Roberta and Sam for their generous hospitality.

• SAN DIEGO CHAPTER, *San Diego, Calif., Aug. 21*—This was the date of the annual steak barbecue at the barbecue pit and patio of member Kenny Young. Delicious two-inch steaks were served along with all the trimmings. Refreshments flowed freely and several games of skill and chance were played under lighted trees in the patio. The chapter voted a round of thanks to Kenny Young for his all out interest and preparation in planning the barbecue. Members of San Diego Chapters would like other chapters to note the fun they have in the Southwest Corner.

• SCIOTO CHAPTER, *Marion, Ohio, Sept. 11*—During the business session it was suggested that a question box be provided where members could deposit questions they wished answered. These questions would then form the basis of discussion during each meeting. The guest speaker of the evening was R. B. Breneman of Armstrong Cork Co., Columbus, Ohio. He gave an interesting talk on insulation from the time it was first used until the present time, displaying samples of different types of insulation.

• TOLEDO CHAPTER, *Toledo, Ohio, Sept. 10*—A new Secretary was elected to fill the unexpired term of Harold Dille who has resigned. Fred Dennis was the sole nominee and unanimously elected. Ken Newcomb of Remco, Inc. was the guest speaker of the evening on the subject of driers and heat exchangers.

• TRI-COUNTY CHAPTER, *Aurora, Ill., Sept. 14*—The chapter held its annual picnic at Fabian Park on this date. Fifteen members, their wives and families and one guest, E. Duck, motor expert from Elgin, and his family were present. There was an abundance of good food; baked spiced ham and barbecues, ice cream and beverages of all kinds. As the temperature was in the upper nineties, the only activity to speak of was pitching horseshoes.

• TWIN CITIES CHAPTER, *Minneapolis, Minn., Sept. 2*—The speaker of the evening was Mr. Weber of Air Reduction Sales Company, who provided a demonstration and talk on low temperature brazing and the use of silver solder or Easy Flo. Bart Syers of Schnacke, Inc., was a visitor.

• WOLVERINE CHAPTER, *Lansing, Mich., Sept. 8*—Upon resuming meetings after the summer vacation a motion was made that the chapter hold two meetings a month starting with October. The first meeting of the month would be devoted to business, and the second meeting held for entertainments, educational work and other such matters. Albert Gary was appointed Chairman of the Entertainment Committee to be assisted by Clare McNaughton.

LADIES AUXILIARY

• KANSAS CITY AUXILIARY, *Kansas City, Mo., Aug. 21*—Mrs. R. A. McCullough's application for membership was received and accepted and Mrs. McCullough welcomed as a member of the Auxiliary. It was reported during the business session of the afternoon that 20 children's dresses were made for the Mutual Help Center. Twelve were made by Luceal Taylor and eight by Edna Visger. Other members expect to add to this number after the beginning of the Fall school term. A raffle gift, Hasko trays, donated by Edna Visger, were won by Hazel Brown. Ice cream and homemade cakes were served by Mrs. Taylor with the aid of Mrs. Ferguson and Mrs. Visger.

* * *

QUESTIONS AND ANSWERS

(Continued from page 54)

laden refrigerating system with CO_2. I understand that CO_2 contains considerable moisture and would like to know your opinion in this matter. The system I am having trouble with started leaking in the suction line and

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1922 FIRST HANDMADE MODELS

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Hermetically sealed, open type self-contained and remote units exclusively for leading manufacturers. 1/6 to 15 h.p.

before it was discovered considerable air and moisture was drawn into the system. The above system is charged with methyl chloride.

Another serviceman claims that in a methyl chloride system the motor fan should pull air from the condenser while in a sulphur job the fan should blow through the condenser. Rather a peculiar idea, I think, but he may be right.

Is there any way of determining if a system is moisture laden?

ANSWER: I don't believe that CO_2 can be relied upon to do a very thorough job of drying a refrigerator system. It is commonly used as a means of blowing out moisture in those cases where a water-cooled condenser may have burst and admitted large quantities of moisture. However, the final stages are done either by baking or the installation of a drier unit. CO_2 in some cases may be dry enough to pick up moisture but I don't think it can be relied upon as a final drying process.

I have never heard that a fan should operate in one way for sulphur dioxide and another for methyl chloride. It seems to me that it is the manufacturer's choice whether he has the fan pulling the air from the condenser or pushing the air through the condenser. In some cases there might be an advantage in pulling the air through the condenser so as to have a low temperature air passing over the condenser surface. A fan does the double job of cooling the condenser and the motor and where the air is pushed through the condenser it is warmed up by the heat of the motor before it passes over the condenser.

The only way I know of to determine whether the system has moisture in it is by its operation. Moisture will usually cause trouble at the expansion point, and to determine whether or not moisture is present, some means of warming up the point of expansion is used to see if this corrects the trouble. Carbon in the system and copper plating are indications of moisture but it is necessary to dismantle the compressor in order to determine in this manner. To determine whether moisture or wax is causing trouble at the expansion point, it is necessary to quickly pump the system down and remove the expansion valve. If moisture is the cause you may or may not find any traces of it, depending on the amount of moisture present. Wax will appear as a creamy mass in the screen and other valve parts. It will quickly melt into an oil smear upon contact with the air.

TAKE GUESS OUT OF ESTIMATING

(Continued from page 44)

tion I would recommend that it be junked, but if it had possibilities of being worth fixing up for resale, I would get a proposition something like this.

"Look, Don. You go ahead and fix it up. Then when I sell it we'll split whatever it brings fifty-fifty." Fine, if he ever sold it, or if he sold it at a price that would let me come out on my labor and parts. But, since the dealer had already written it off as a total loss, anything he got out of it was pure velvet. In some instances they would let an old customer have it for a summer cabin or something like that at a price that would leave me holding the bag. Of course that made a fine fellow out of the dealer, and no doubt it helped him build a lot of good-will. But all it did for me was to ruin my disposition and put my blood pressure up.

Another angle that came up pretty often on trade-ins was this. I would do a repair job on an old box and the bill would run quite high. In order to get out from under this bill the customer would trade for a new refrigerator. The dealer, without consulting me, would agree to square the repair bill in order to make the sale. In one case the dealer offered to give me the trade-in. Since it had already been put in good operating condition it looked like a good proposition for me. And it was. Except for one important thing.

I sold this box almost as soon as I got it in, and at a price that was well above my repair bill. I was congratulating myself on turning a good piece of business from my original contract dealer. He came steaming into my shop with blood in his eyes. "What the Hell is the idea," he demanded. "I had Mr. So-and-So all but signed on the dotted line for a new refrigerator. Now you come along and queer my deal by selling him a second-hand one. By God, brother, if you're going in for appliance sales you had better get out of the service business. I'm not going to give you my service business and then have you in competition with me on sales." Well, what could I say? This man had been fair with me in every respect. I had to agree that he was right, and promised that it would not happen again. It began to look as though I couldn't win.

I finally wound up by telling all of my contract dealers, except the original one, to go to Hell. If they wanted me to do their work it would have to be on a free-lance basis and at the regular rate for labor and material. Needless to say, I

REPAIR TERMINAL LEAKS IN 5 MINUTES!

WATSCO REPLACEMENT TERMINALS

$5.50 PER SET (3 terminals)

Permanently stop terminal leaks on any sealed unit easily, quickly, profitably. Instead of 6 or 7 hours—5 minutes! Instead of removing the unit—work right on the job! Instead of welding and machining, use only ratchet wrench or pliers! Just screw the WATSCO REPLACEMENT TERMINAL. Put in right over the original terminal post. The job is done!

#1 —for Crosley F-12 Unit

#2 —for Frigidaire—up to and including 1937

#3 —for Kelvinator, Norge, Westinghouse, Chieftain, Tecumseh, Philco.

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REMOVE OIL RINGS IN A JIFFY!

WATSCO OIL RING PULLER

Cannot mar or damage ring or shaft. A quality precision tool—made of finest hardened steel, WITH BALL BEARING TIP, cadmium plated. Engineered for lifetime performance!

Write for the complete catalogue of WATSCO precision instruments, Dept. AF, mentioning jobber's name and address.

$7.50 EACH
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Part No. P-1

WAGNER TOOL & SUPPLY CORP.

Dept. AF, 1300 43rd Avenue, Long Island City, N. Y.

didn't get much work from them. They continued to keep all the good jobs for their "own man" and called me on all the tough ones. The only difference was, I could now turn down the work if I thought it couldn't be done at a profit, and I didn't have to worry about whether Mr. or Mrs. So-and-So were going to be buying a new appliance soon.

I don't seem to have made out a very good brief for contract service, but these are the things any service shop operator will come up against if he takes on such work. It's better to know the facts than to go ahead blindly and find out the hard way as I did. In spite of all the pitfalls in contract service, I still think it has great possibilities if it is gone about in the right way. If every possible angle of the situation is threshed out beforehand, and a sensible contract is drawn up, it could work out very well. The next season, in a larger town, I had a similar deal with one large operator and he gave me more work than I could handle. It worked out very well and we both made money.

S S S

ADMIRAL DUAL-TEMP

(Continued from page 37)

of 95 volts is required for satisfactory starting.

Overload Protector

The overload protector is connected in series with the motor windings and serves to protect the unit against overheating. A small resistance wire develops a heating effect which acts upon the circuit breaker (Bimetal disc.). Normal operating current will not develop sufficient heat to trip the overload protector but any condition causing abnormally high current will trip the overload protector. The protective action is made more effective by mounting the protector in contact with the housing of the sealed unit. Any condition responsible for abnormally high operating temperature will cause the overload protector to trip even though the operating current is normal.

The overload protector automatically resets itself after having tripped. The time interval required for the protector to reset depends on the temperature of the unit housing. The higher the temperature, the longer the time required for the protector to reset.

A condition known as "cycling on the relay" occurs when the protector repeatedly trips after resetting itself. Stalling due to low voltage and other conditions causing overheating will cause cycling on the relay. Cycling on the relay may also occur as a result of pull down overload.

Starting Relay

The starting relay is a magnetic switch, the magnet coil being connected at all times in series with the running winding in the sealed unit.

The high initial starting current causes the plunger to rise and close the contacts in the circuit of the starting winding. Both windings being thus energized, the motor starts. As normal running speed is approached, the current diminishes to a point at which the plunger "drops out," opening the starting winding circuit. After the starting relay has performed the function of supplying current to the starting winding during the starting interval, the motor continues to run on the running winding only.

S S S

ICE SKATING SURFACES

(Continued from page 32)

Auxiliaries

The condensing unit does not differ from that of comparable size, for other applications. The number and size of auxiliary equipment, storage tanks, pumps, heating and air conditioning equipment, brine heaters, etc. varies in design, more than the primary equipment. A tank, large enough to store the brine when pumped from the coils, is a distinct advantage, as it can be insulated and very little refrigeration will be required to keep it at desired temperature.

Where ice must be removed occasionally for other exhibitions on the floor, heated water may be circulated through the coils. This should also be retained in storage in insulated tanks. Methods of heating may be steam, hot gas from the refrigerating system or a combination of both. Certainly the heated condenser water should be used as a water preheater or for some useful purpose. The exact methods and equipment used depend upon the requirements of the system and the judgment of the designing and operating engineers and management, and vary greatly.

Air conditioning for ice rinks presents special problems which need to be considered in the overall operation. These will be considered in a forthcoming article.

The BEN-HUR
FARM and HOME FREEZER

"In a Class by Itself"

MODEL 2127 — 12.5 cu. ft.
Capacity, about 625 lbs.

Top value in beauty . . . precision - engineered construction . . . service - free operating economy . . . better food protection . . . guaranteed customer satisfaction.

HEALTHFUL LIVING THROUGH FROZEN FOODS

BEN-HUR FARM & HOME FREEZERS

BEN-HUR MFG. CO., DEPT. RS, 634 EAST KEEFE AVENUE, MILWAUKEE 12, WISCONSIN

ENGINEERS! HERE'S REAL HELP!

The New Rempe

THE ONLY BOOK OF ITS KIND

providing all fundamentals of pipe coil and fin coil calculation.

ENGINEERING DATA BOOK

Prepared especially for the design engineer for laying out pipe coils and fin coils for heating and cooling applications.

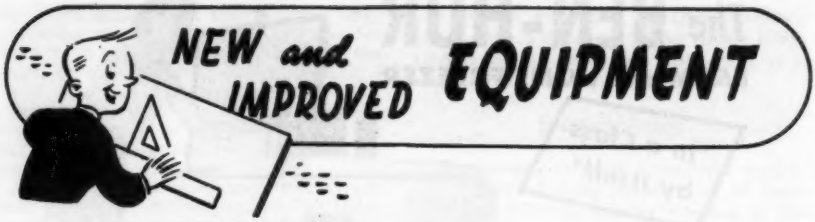
Gives Heat Transfer "K" factors for all ranges of heating and cooling from minus 60° F. to plus 350° F. for both pipe coils and fin coils.

It shows how to calculate and design pipe coils and fin coils for all generally encountered heating and cooling loads.

Contains complete recommended Air Velocities and Fin Spacing for fin coils. This treatise is as necessary to the designer of pipe coils and fin coils as is his slide rule and costs only $1.50 per copy. Send check with your order—we pay postage.

REMPE CO.

358 N. Sacramento Blvd.
Chicago 12, Illinois



Fruit Juice Vendor

TELE-JUICE, a new dispenser of refrigerated, canned fruit and vegetable juices, will shortly be introduced on a nation-wide scale by the Telecoin Corporation, national distributor of coin-operated merchandising and service devices.

The new dispenser, a clean-cut, six foot vending machine, boasts unique sanitary features and is simple to operate and service.

Sanitation is underscored in all engineering aspects of the Tele-Juice. The customer chooses his drink from the selections shown in the illuminated upper display windows. He deposits a dime in the coin chute, presses a button under the flavor he wants, and the can is automatically delivered to his hand.

The can is then placed in an opener chamber on the left side. A knife-type can opener, kept at a constant temperature of 180 F is enclosed in a dustproof chamber. The knife, mechanically operated by a foot pedal, makes a clean incision just big enough to admit a straw. The high temperature serves a dual purpose—it prevents bacterial growth and precludes rusting of the opener.

Tele-Juice dispenses six kinds of fruit and vegetable vitamin health drinks simultaneously for ten cents a can. The machine holds 300 six-ounce cans at a time, 50 in each of its six racks. Over a period, the types and flavors may be changed, ultimately providing over a dozen varieties.

The straw dispenser opposite the opener is also enclosed for added sanitary precaution. A circular orifice below the delivery chute is large enough to accept the used cans and straws. It empties into a large waste compartment which can be easily removed for disposal.

The new dispenser operates on the gravity principle, an engineering feature which eliminates all movable parts and makes servicing a simple routine. Electrical refrigeration ensures maintenance of the same even, refreshing temperature in July or January.

Tele-Juice is already commanding wide attention as the first electrical vendor of truly nutritive, vitamin health drinks. Operators view it as ideal for such locations as plant floors of large industrial operations, bus terminals, airline and railroad waiting rooms, theater lobbies, stores, and marketing centers, as well as the obvious sites like recreation centers, schools and offices.

Although engineering of this type machine was initiated by Telecoin as far back as 1941, the Tele-Juice is a completely modernized, post-war development. Careful planning and machine design were perfected during the war years, and the new vendor was ready for production as soon as wartime stringency was relieved and the necessary materials became available.

Calculator

THE General Engineering & Manufacturing Co., Saint Louis, Mo., have available to service engineers the Gemco Coolometer, which is a calculator for air conditioning cooling loads. It is a simple measuring device, originated by Gemco engineers, with which

EMERGENCY PROTECTION!

AGAINST OVERPRESSURE IN REFRIGERATION UNITS

BS&B SAFETY HEADS

● SAFETY HEADS offer emergency protection . . . a positive margin of safety that will prevent accidents and costly equipment losses. The simple rupture diaphragm is guaranteed to burst in tension within five percent of predetermined pressure . . . up to 25,000 psi. No other relief device can approach the relief capacity of a SAFETY HEAD in a given diameter! A size for every need . . . tailored to fit. No working parts. Burst diaphragm quickly, easily relaced. Write today for complete information and specifications. Address the Special Products Division, Black, Sivalls & Bryson, Inc., Power and Light Building, Kansas City 6, Missouri.

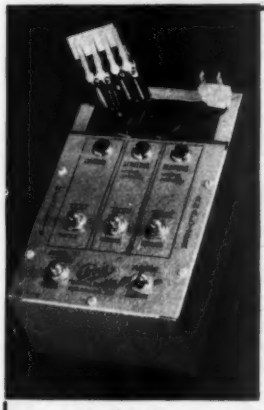
Thousands of plant owners all over the world rely on SAFETY HEADS for complete protection. Put them to work for you!

FOREIGN INQUIRIES INVITED — Cable Address: BLACK, KANSAS CITY, U.S.A.

EFFICIENCY RELIABILITY

BLACK, SIVALLS & BRYSON, INC.

KANSAS CITY, MO. — OKLAHOMA CITY, OKLA.
CASPER, WYO. — CALGARY, ALTA.



Let "Annie" Do It!

HERE IT IS!

A hermetic unit analyzer which in a matter of seconds will positively indicate the nature of any defect in the electrical system.

ACTS AS A SALESMAN—

Also, you can now positively show the owners of such equipment just what is wrong and thus gain their confidence.

NO TIME LOST—NO LABOR LOST—NO GUESSWORK

It is a repair man's answer to the nightmare of not knowing what is wrong without the labor of transporting to the shop and then submitting to a series of tests; an exact estimate on the spot.

ACCURATE—YOU CAN NOW ESTIMATE CLOSELY WITHOUT FEAR OF HAVING TO TAKE A LOSS

This is a "must" in any repair box. Be sure yours has it. Don't be embarrassed by having a prospective customer asking you, "How do you know?"

SPECIFICATIONS — "ANNIE" weighs only 1¾ lbs.—size, 3" x 5" x 8"—will fit into tool box. Price $16.50.

ORDER FROM YOUR JOBBER OR DIRECT. INCLUDE JOBBER'S NAME AND ADDRESS. MAKE CHECK OR MONEY ORDER PAYABLE TO:

Mechanical Enterprises

Dept. 36

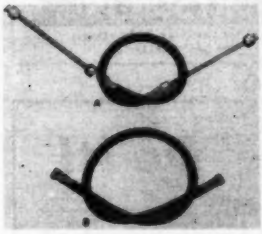
7736 Tujunga Ave. North Hollywood, Calif.

the heat produced by the probable number of people in the space, heat radiation of lights and appliances, variations for humid and average climates, number of windows, sun exposures, etc., can be rapidly calculated. In short, the Coolometer quickly tells how much cooling is required in any given room.

The General Engineering & Mfg. Co. are selling the Coolometer at their cost and the device has proven very popular among those who have used it in the past. Inquiries should be addressed to the company at 4417 Oleatha, St. Louis 16, Mo.

Charging Hose

CHARGING hoses that withstand temperatures to —40 F and pressures in excess of 1000 lbs. per square inch are a new offering of the Fine Products Company, 185 North Wabash Avenue, Chicago.



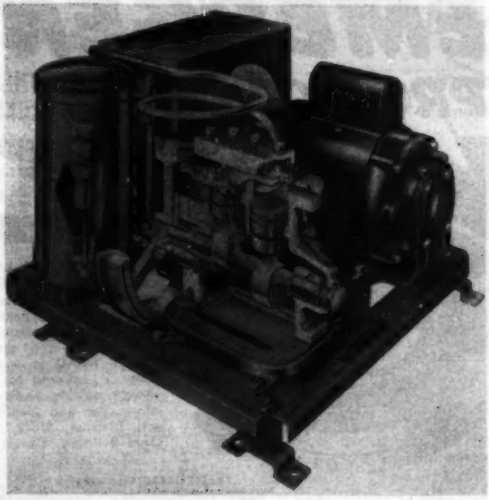
The heavy duty rayon reinforced neoprene hose is exceptionally flexible and sturdy; will permit small radius bends without kinking. Low original cost and high refrigerant resistance means long time use and resulting economy.

The new hose is available in two types.

Type A is a standard ¼-inch hose, overall length 36 inches, with 24 inches of hose and 6 inch flared copper tubes on each end.

Type B has a "Rapid" quick-coupler type joint on each end, with replaceable neoprene gaskets. An improved, two-piece coupler of integral construction assures a leak-proof joint without the need for wrench tightening. One-half inch knurled nuts on the couplings provide adequate surface for ease in hand tightening.

Condensing Units



NEW light duty ½ h.p. condensing units started rolling off the production line at Jack & Heintz Precision Industries, Inc. on September 22nd.

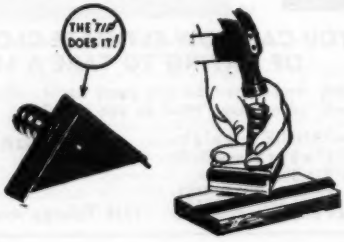
Two models, the R-50A and the R-50B, were designed by Jack & Heintz Refrigeration Engineers to fall into the light duty classification to simplify selection of sizes in borderline cases when an ordinary "third" might not provide sufficient capacity and a heavy duty "half" would be impractical from a cost standpoint.

These new units broaden the J & H line and are expected to help meet the heavy demand of Refrigeration Wholesalers and Equipment Manufacturers now absorbing the record production of the company's ¼ and ⅓ h.p. models.

Gasket Notcher

AN IMPROVED door gasket notcher has been introduced by Jarrow Products Company, Chicago, that should prove to be a boon to busy refrigeration service engineers.

Common practice, when fitting a replacement door gasket on a refrigerator door, has been to cut wedges in the gasket with a pocket knife so as to be able to bend the gasket into a 90° turn for the corners. Due to the characteristics of the gasket, this has been practically impossible to do accurately. The results, too often, are bulging corners that do not fit properly and leak air.



The Jarrow Gasket Notcher cuts a true 90° angle. At the apex of the angular cut, a small rounded tip of material is removed permitting the formation of a perfectly mitred corner. The tool cutting blade can be easily re-

Next to a new OASIS they'll want EBCO's convenient "DIAL ACTION" BUBBLER

OASIS is Warranteed for 5 years!

Smooth, "dial-a-drink" action of the Ebco Bubbler is one of many features winning top place for Oasis Electric Water Coolers. This streamlined, heavily chromed all-brass bubbler responds instantly to a slight easy turn of the control . . . with a steady, spurt-free flow of water that assures fullest drinking satisfaction. You can *profitably* please your customers by installing this advanced bubbler on their present coolers—giving them *the next best thing* to a new Oasis! Write for details today. Oasis *Water Coolers offer sizes and models for every need.*

EASILY ADDED TO MOST COOLERS

BALL-BEARING ROTARY ACTION
NON-SQUIRTING FLOW
SELF-CLOSING VALVE
AUTOMATIC FLOW CONTROL
SMOOTH, STEADY STREAM

EBCO "12000" BUBBLER

The EBCO Manufacturing Co.
401 W. Town St., Columbus 8, Ohio

DO YOU REPAIR ELECTRIC MOTORS?

If so—WRITE NOW for the new

HARCO 1947 CATALOG

of complete up-to-date information on all makes
ELECTRIC MOTOR PARTS, BEARINGS, BRUSHES
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LIMITED EDITION because of paper shortage—WRITE AT ONCE

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HARCO EQUIPMENT CO.

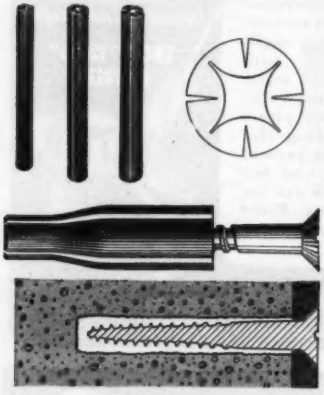
2456 NINTH STREET, N. W. WASHINGTON 1, D. C.

moved for resharpening or replacement.

To cut a gasket corner, the Jarrow Notcher is placed on the gasket and the tool is struck a sharp blow with a hammer.

Screw Anchors

A BASIC new development now makes available a universal all purpose screw anchor known as the Sandscott Plastic Expanding Anchor. The design simplifies anchoring, costs are greatly reduced and tremendous holding power is assured.



The anchors may be used with wood screws or lag screws for fastening into any material, such as: Concrete, brick, plaster, tile, stone, marble, terra cotta, composition boards, slate, metal, bakelite, rubber, glass, stucco, wood, etc.

Overlapping internal and external slits give the "Concertina" expansion, indispensable in an anchor for dependable holding power in any material. This invention develops a holding power far greater than ordinary requirements. Pittsburgh Testing Laboratory conducted many "pull-out" tests. In several instances the screws broke in endeavoring to pull them out of concrete. The maximum load pull was 2,965 lbs. using a No. 20 screw.

The anchors are made slightly larger in diameter than the hole size to be drilled. The concertina expansion feature compresses itself and the toughness of the plastic enables it to be driven into a tight hole thereby getting every fraction of holding power when the screw expands the anchor in any material. The plastic used is tough, yet pliable and has great impact and tensile strength—5,000 lbs. per square inch. It is unaffected by water, moisture, weather or acids. Immune to age and corrosion—will not rot. Will withstand temperatures to —78 F or up to 180 F. Has good electrical characteristics — shock and vibration proof.

Available now in seven popular sizes in various lengths to accommodate all lengths in screw sizes ranging from No. 5 to No. 20, or ¼" and 5/16" lag screws. The tremendous holding power permits use of smaller screws which saves the higher cost of using larger screws and anchors. The holes required are neater, faster and easier to drill. No special tools are needed. The Anchors can easily be cut to any required length with cutting pliers, knife or a saw.

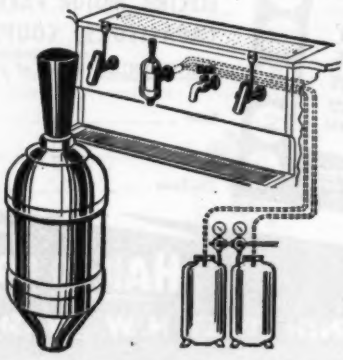
Packed in cartons of 100, also available in a contractor-industrial assortment of all sizes in a transparent sectional plastic Kit.

Carrying Case

A NEW idea in cases for portable instruments for the radio and television servicemen has been developed by Simpson Electric Company, Chicago. Called the Roll Top Safety Case, it has been engineered for Simpson's very popular Model 260 Volt-Ohm Milliammeter. Combining Case and instruments, the Roll Top Case becomes an integral part of the assembly. The instrument itself is permanently fastened into the Roll Top Case which is of heavily molded bakelite, large enough to provide a compartment for leads beneath the instrument. The front is covered by the Roll Top panel, a sliding cover of narrow bakelite segments on a backing of cloth. This cover, similar to roll-top desk construction from which it takes its name, rolls up to make the instrument ready for use. Unlike desk tops, however, this neat and modern Roll Top rolls up at the flick of a finger. Another flick of the finger closes it to protect the instrument and make it ready for carrying. A heavy leather carrying handle completes the assembly. The case is so designed that the Simpson 260 may easily be serviced for battery replacement. Announced only a short time ago, the new Roll Top Safety Case has created unusual interest among users and jobbers.

Dispenser

NEXT time you're in a bar and see the barkeeper draw an ice cold soda, coke or gingerale chaser out of the same faucet—don't feel that your eyes are playing tricks. Hudson Products Co. of Detroit, Michigan have just announced its latest invention a 3-Way Drink Dispenser.



According to the manufacturer, the dispensing system consists of a faucet with a vertical handle which controls the syrup valves. By pulling the handle straight forward—soda water is dispensed. Move the handle to the right and a cola drink comes out. Then pull the handle to the left for gingerale.

REMOTE WATER COOLERS

For drinking water bubbler service, glass filler service, photographic developing, etc. Compact for floor, wall or ceiling installation. Capacities 6 to 25 gallons.

Also available now—cafeteria glass filler coolers, self-contained type bubbler coolers for offices, stores or factories. Write for latest data.

DAY & NIGHT
REFRIGERATION DIVISION
DAY & NIGHT MFG. CO.
One of the Dresser Industries
MONROVIA, CALIFORNIA
SOLD THROUGH REFRIGERATION WHOLESALERS AND DEALERS

HERVEEN the Replacement Refrigerant

Servicemen—Herveen is the IDEAL REPLACEMENT GAS for Meter-Misers. When your Frigidaire Meter-Miser customers need service on their unit, don't turn them down with the statement "the refrigerant is not available." We can deliver

HERVEEN the IDEAL

REPLACEMENT REFRIGERANT

Many service companies are using this refrigerant for charging Meter-Misers in their localities.

★ Meter-Miser calls are routine with a supply of HERVEEN.

★ Installing HERVEEN does not involve more than average care.

For deliveries, see your local jobber or write to

Conservative Gas Corporation, Modern Gas Division
MANUFACTURERS AND REFINERS
1084 Bedford Ave. Brooklyn 5, New York

News of the Equipment Industry

WHICH WAS THE FIRST AIR CONDITIONED ESTABLISHMENT

WHAT are the five largest air conditioning installations in the world? Which was the first air conditioned drug store in the country?

The Refrigeration Equipment Manufacturers Association is seeking the answer to these questions in compiling data on the history of comfort air conditioning.

If you have a candidate for one of the world's biggest installations, or a drug store owner who installed air conditioning early and believes he may have pioneered in the drug field—contact REMA, care of Theodore R. Sills & Co., 39 S. LaSalle Street, Chicago 3, Ill. The association will want the date and extent of installation and a very brief description of the type of equipment.

The refrigeration and air conditioning industry today is said to be the fastest growing industry in the world. The association is compiling the early history of the industry and awarding scrolls to the first users of mechanical refrigeration for comfort air conditioning, recognizing them as pioneers.

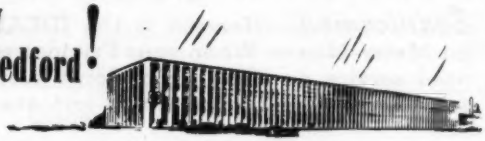
The association also is obtaining material on the first air conditioned stores, beauty shops, funeral parlors, hospitals, factories, theaters, printing plants, photographic studios, and radio stations. Recognition scrolls are being awarded those establishments found to have pioneered air conditioning in their particular fields.

\$ \$ \$

INDUSTRY SHOW HOUSING HANDLED THROUGH CONVENTION BUREAU

EVERYTHING possible is being done to arrange adequate housing to accommodate everyone attending the 5th All-Industry Refrigeration and Air Condition-

Announcing the New Ace Plant at New Bedford!



To Serve You Better With Better Ace Products

WE are pleased to announce the new Ace Plant at New Bedford, Mass., providing 100,000 square feet of manufacturing space, which is now in operation. These expanded facilities, together with recent engineering developments enable us to serve you better than ever before.

Among the features of the new plant, is straight line production which will increase output to record levels, thus climaxing 23 years of experience and sound development in the manufacture of refrigerating equipment.

Plant: Ace Cabinet Corp. 278 Bellevue Avenue New Bedford, Mass.

Show Room: 1338 Inwood Avenue New York 52, New York

Ace Products:

Ice Cream Dispensing Cabinets

Upright Ice Storage Cabinets

Home and Farm Freezers

Frozen Food Display Cabinets

Soda Fountains and Bobtails

I'M A NEW
Arlington Seal
Wise men use me because only my shoulder bone (ring) rotates with my contact (the shaft).
I can be installed easily and rapidly, saving man hours.
I am a uniform flat smooth seal with diaphragm synthetic rubber ring. All the way through I am made of the highest grade steel and bronze, precision finished to millionths of an inch.
All the better jobbers have me on their shelves or you can find out more about me by writing . . . .
MODERN DESIGN PRODUCTS CO.
"Arlie"
YOUR SEAL
ONLY THIS SHOULDER SEAL RING ROTATES WITH THE SHAFT
Arlington
SHAFT SEAL
MODERN DESIGN PRODUCTS CO
CHICAGO 24, ILL.

GET THE JOB OPERATING

FASTER!

NEW Premier Kit RECONDITIONS RECESSED OR FLUSH VALVE PORTS IN MINUTES!

Now you can easily grind, finish and test recessed or flush valve seats (either piston or flapper jobs) . . . get 'em back into action faster . . . and make satisfied customers! No more tiresome hand-lapping.

COMPLETE SET PACKED IN HANDY CASE

Contains self-aligning tool holder, 6 abrasive wheels for roughing, 6 cast iron lapping disks, two 3" cast iron lapping blocks, 1 wheel dresser and 1 valve tester. Complete instructions enclosed for handling ½" to 1¼" valve seats.

SEE IT AT YOUR JOBBER!

THE PREMIER CO.
891 PARK AVENUE • BALTIMORE 1, MD.

CESCO'S Healthguard Fume Kit (No. 605) offers *triple protection* to refrigeration servicemen. Quick-change filter cartridges assure safety against ammonia, methyl-chloride and sulphur-dioxide fumes . . . *all in one convenient carrying case.*

The soft molded rubber face-piece of the fume mask, and the adjustable headgear assure a gastight, comfortable fit for every wearer. Large safety glass lenses give perfect visibility.

The CESCO Healthguard Kit provides *economical* protection because it is *moderately* priced.

Write for CESCO'S *No. 605 Safety Bulletin for complete information*

CHICAGO EYE SHIELD CO.
2340 Warren Boulevard
Chicago 12, Illinois

CESCO
FOR SAFETY

ing Exposition in Cleveland, Jan. 26-29, according to F. J. Hood, chairman of the show committee.

Housing plans are based on experience gained in 1946 in handling the tremendous crowd which attended the 4th All-Industry Show. After consulting with hotel managers and housing authorities in Cleveland after that exposition, the board of directors of the Refrigeration Equipment Manufacturers Association decided to handle all hotel reservations in 1948 through the Cleveland Convention and Visitors' Bureau. REMA is the sole sponsor of the 1948 show.

F. J. HOOD

"I think that we can assure that anyone placing reservations by about the first of October need not worry about accommodations for January," Hood said. "However, those persons who do not make reservations until the last minute for one reason or another may encounter some trouble."

Wayne Stetson, manager of the Cleveland Convention and Visitors' Bureau, has reported to REMA that in order to handle the housing task with the greatest efficiency and speed possible, the bureau is operating a housing service to function solely for the 5th All-Industry Show. This department is processing and assigning all hotel rooms.

"The plan of clearing all reservations through this one central agency has proven very effective for other large industrial shows in Cleveland," Stetson declared. "It will assure the most effective use of the hotel space and will eliminate much of the housing confusion."

Hood announced that in October the 1948 Show Committee will meet in Cleveland with representatives of REMA, RSES, and NARC, at which time individual hotel assignments will be made.

D. D. WILE JOINS REFRIGERATION ENGINEERING, INC.

D. D. WILE, formerly with Carrier Corp., has joined the engineering staff of Refrigeration Engineering, Inc., Los Angeles, Calif. His new affiliation became effective as of October 1.

PREPARE FOR A *Bigger Size!*

LOOK AHEAD. Can you see ANYTHING small about refrigeration for the future? Doesn't EVERY phase and branch promise something BIG for men who are themselves BIG enough to grasp the opportunities?

THE U.E.I. PROGRAM OF BALANCED TRAINING (home study plus intensive shop practice) is designed for men who want to grow BIGGER in refrigeration and air conditioning knowledge and skill. It's for men either in or wanting to get into refrigeration. It is the program of training which is identified with the success of many a man who is filling some pretty big shoes in the industry today. It's the training program which, since 1927, has helped small men grow big in refrigeration. . . . If you're planning to get somewhere in this field, use the coupon below as a starter.

SEND THIS COUPON FOR FREE FACTS

APPROVED FOR VETERANS UNDER GI BILL

UTILITIES ENGINEERING INSTITUTE
2525 N. SHEFFIELD AVE.
Dept. 45, CHICAGO 14, ILL.

Please give me complete information about U. E. I. Refrigeration and Air Conditioning Training.

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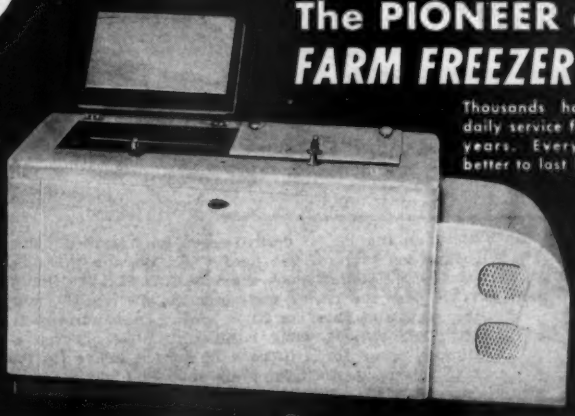
SANITARY *Quicfrez*

The PIONEER of the *FARM FREEZER FIELD*



Thousands have been in daily service for over seven years. Every unit "built better to last longer."

SANITARY REFRIGERATOR COMPANY • Fond du Lac, Wis.

Form No. 1246

Rigidbilt's new plant in Chicago.

RIGIDBILT INCREASES PRODUCTION FACILITIES

THE purchase of a new plant for the manufacture of Rigidbilt finned evaporators and lowside equipment has been announced by W. W. Bradfield, president of Rigidbilt Inc. The Rigidbilt firm, formerly known as Manufacturer's Fin Coil Company, has its present location at 2505 S. Pulaski Road, Chicago.

The new plant is located at Fulton and Francisco Streets in one of Chicago's westside manufacturing districts. It has triple the floor space of the present Rigidbilt plant, and increased production is anticipated on such Rigidbilt products as air conditioning and steam heating coils, counter coils, gravity coils, unit coolers, low temperature units, floor-type product coolers.

Company officials estimate that from two to three months will be required until the new plant will be ready for manufacturing operations. In the meanwhile, a full production schedule is to be maintained at the Pulaski Road address.

NOW... RESURFACE ANY FRIGIDAIRE FLOAT NEEDLE SEAT *in 1 Minute!*

$7.50 each including file and DIRECTIONS FOR FLOAT RECALIBRATION

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Right on the job, if desired—even an unskilled helper can accurately resurface the needle seat on any Frigidaire low side float! Simply place the WATSCO FLOAT RESEATING TOOL over the needle seat—pass the file several times over the seat—and there it is!—a perfect new surface in ONE MINUTE, without using lathe, drill press or even a vise! Durably made for a lifetime of service. Pays for itself in 1 or 2 jobs. A must for every shop and service man's kit!

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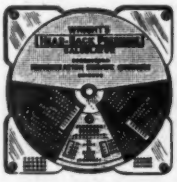

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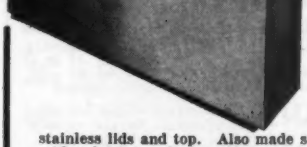

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WHOLESALERS' TRADE REPORT

ACCORDING to the Department of Commerce, Bureau of the Census report on wholesalers' sales and inventories, 33 refrigeration equipment wholesalers reported sales of $2,183,000 for the month of June, 1947. This is an increase of 5% over May of the same year and an increase of 34% over June, 1946. The total sales for the 33 jobbers indicate an average of $66,150 per wholesaler.

The Bureau of Census is hopeful that more wholesalers will participate in the July report.

S S S

ASRE ISSUES PAMPHLET ON REFRIGERATION OF SHIPS' STORES

THE application of refrigeration for the preservation of food on shipboard is comprehensively described in a six-page pamphlet, Refrigerating Engineering, Application Data 28, "Refrigeration of Ships' Stores", issued recently by The American Society of Refrigerating Engineers, 40 West 40th Street, New York City.

This Application Data Section, originally published in 1941, has been extensively revised and additional material added to bring it up to date. It covers the special conditions peculiar to marine refrigeration applications, the load calculation, perishable food cargoes, and some data on air conditioning aboard ship.

The original A D 28 was written by C. B. Albright, engineer, New York City. The extensive revisions have been made by R. A. Chadburn, Heat-X-Changer Company, New York City, and Joseph W. Geddes, resident engineer of Lockwood Greene Engineers Inc., Seattle.

ASRE to Meet in Atlantic City

THE 43rd Annual Meeting of The American Society of Refrigerating Engineers will be held in Atlantic City, New Jersey, December 8 to 10, 1947, it has been announced by R. H. Money, president of the Society. Headquarters of the meeting will be the Hotel Traymore.

Some of the highlights of the three-day session will be papers presented by J. M. Lemon, chief of technical research of the U. S. Department of Interior on fish freezing at sea; S. W. Brown, chief engineer of the marine department of Carrier Corporation will discuss mechanical developments

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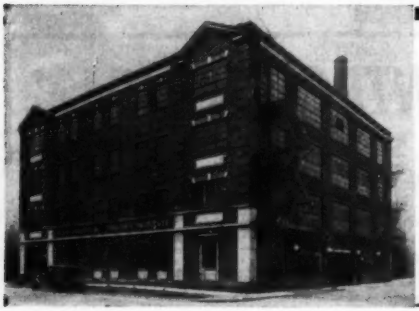

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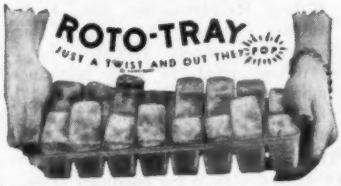

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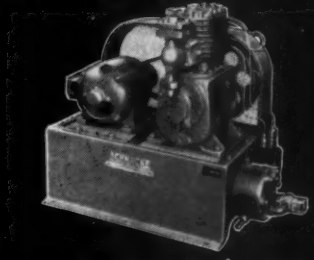

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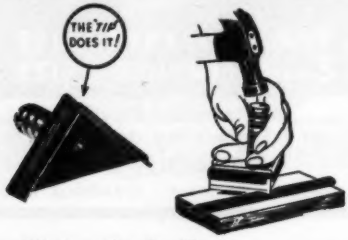

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in marine refrigeration; and L. C. Marshall, division of electrical engineering at the University of California, speaks on technical factors in greenhouse air conditioning. A few of the other topics to be covered on the program will include papers on refrigeration as applied to concrete dams, storage of edible nuts, and papers on the heat pump.

Although the convention does not officially open until Monday, December 8th, a number of committee meetings and advance registration are scheduled for Sunday afternoon, December 7th.

The Philadelphia Section of the Society will act as host for the occasion, with plans for other entertainment features now under way.

S S S

WILSON TO INTRODUCE NEW PRODUCTS AT EASTERN SHOW

JOHN E. WILSON, JR., President of Wilson Refrigeration, Inc., a division of Wilson Cabinet Co., Inc., of Smyrna, Delaware, announced recently that three new Wilson products were introduced to distributors, dealers and the general public at the Eastern States Exposition held Sept. 14-20 at Springfield, Mass.

The new Wilson Hi-Boy home freezer, especially designed for adequate frozen food storage in urban homes, were featured. The other new equipment shown is the Wilson Storsafe Reach-in refrigerator for food storage and the Wilson Reach-in beer and beverage cooler.

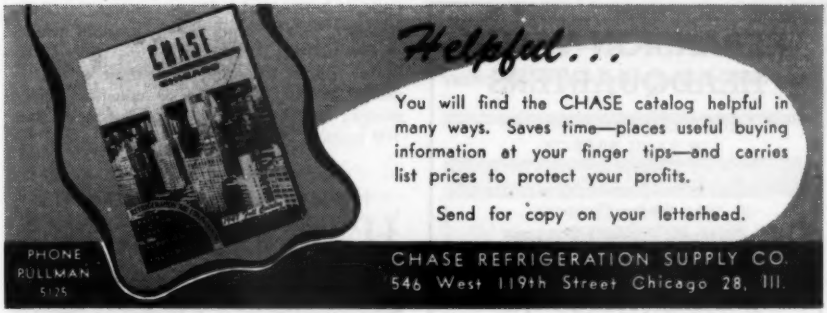
In addition to the introduction of the three new models Wilson Refrigeration, Inc., displayed and demonstrated other Wilson equipment such as Zerosafe Farm Freezers, Zerovault Walk-in Freezers, Stor-Vault Cold Storage Rooms, and the well-known Wilson Zero-Flow and Verti-Coil Milk Coolers.

S S S

G-E MOTOR OUTPUT HIGHEST EVER SOME TYPES STILL SHORT

PRODUCTION of fractional horsepower motors, used in literally thousands of industrial, farm, and home applications, has been boosted to an all-time high at General Electric through a standardization program coupled with increased manufacturing facilities. But supply has not yet caught up with demand for certain types, according to A. W. Bartling, manager of the company's fractional horsepower motor division.

Even though output this year will be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546 West 119th Street Chicago 28, Ill.

"considerably above" the average rate for the prewar years 1936-1940, motors for washing machines, fans, blowers, sump pumps, and similar applications are still in short supply, Bartling said. These are constant-speed alternating-current motors rated from 1/6 to 1/4 horsepower.

Bartling attributed a considerable share of his company's over-all gains in small motor production to an industry-wide fractional horsepower motor standardization program, on which G. E. has co-operated with NEMA.

"Through this program, we have reduced the number of different kinds of motors being manufactured at one time from more than 25,000 to less than 4,000," Bartling said.

"As recently as two years ago it would have been mathematically possible to order motors from our handbooks with as many as 185 billion variations. Such an astronomical number of differences is obviously unnecessary."

Benefits of the standardization program, in addition to facilitating increased production, are greatly in favor of manufacturers who use motors in their products, as well as the ultimate purchasers of those motor-equipped products.

It will make the more popular motor models readily available. Shipment of many models is already on an "off the shelf" basis at G. E. and will be true of most standard models by the end of 1948, according to Bartling. This more dependable supply will allow motor buyers to operate with reduced inventories.

Interchangeability of the standard motors will simplify their application to new products, and minimize the need for product design changes where manufacturers use more than one make. Likewise, servicing will be much simpler, since more customers will be able to take advantage of motor-exchange plans.

Bartling pointed out that special motors will still be offered to those customers whose requirements are such that standard motors cannot be used to best advantage.

General Electric's headquarters for fractional horsepower motor production is at its Fort Wayne (Ind) Works. The company has established other "satellite" plants for motor production exclusively at Decatur and Kokomo, Ind., DeKalb, Ill., and Tiffin,

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. . . now makes suction and discharge valve reeds for leading makes of Hermetic units. Look to Hasco for the best in both conventional and hermetic type compressor parts.

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HASCO, INC.
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Ohio. Collectively these plants produce practically all types of fractional horsepower motors, ranging from tiny series motor parts weighing less than a half a dozen ounces to the large constant speed motors for general use weighing more than 100 pounds.

HENRY VALVE APPOINTMENTS

HENRY Valve Company, Chicago, announces the appointment of Gordon W. Wheeler as Manager in the Export Department. Mr. Wheeler attended Arkansas University and since the war has been active in the General Sales of Henry Products. He is also a member of the Export Managers' Club of Chicago.

G. W. WHEELER

The Company has recently added a complete line of Solenoid Valves to their already internationally known line of valves, driers, strainers and accessories for refrigeration and air conditioning.

HAAG JOINS SALES STAFF OF JACK & HEINTZ INDUSTRIES

FRANK A. HAAG, who for the past 16 years has been intimately associated with the refrigeration industry in production, engineering, and sales capacities, has joined the sales staff of Jack & Heintz Precision Industries, Inc., Cleveland, Ohio, Edward R. Legg, Vice President in Charge of Sales, announced today.

F. A. HAAG

With Jack & Heintz, Mr. Haag assumes full charge of sales application work on the hermetically-sealed refrigeration compressor manufactured by the company.

Immediately following his graduation, with the degree of Bachelor of Science in

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Mechanical Engineering, from the University of Michigan, Mr. Haag became affiliated with the Fedders Manufacturing Co., where from 1931 to 1940 he was employed successively as experimental engineer and as manager of the Cincinnati and New York offices.

Joining Kold Hold Manufacturing Co. in 1940, he served as sales engineer for two years, then was elevated to the position of sales manager, which he occupied from 1942 to 1945.

Refrigeration wholesalers throughout the country now are displaying the Jack & Heintz condensing unit on attractive showroom display stands.

The unit rests upon the glassbrick top section of the walnut-finished stand, which features subdued interior illumination. Complete information regarding the unit is contained in sales promotion literature prominently placed in cabinet storage space provided for that purpose.

Jack & Heintz makes the stands available as a further service to its national network of top-flight jobbers.

In the latter year Mr. Haag was engaged by Salem Engineering Co. of Salem, Ohio, as manager of the Refrigeration Division. In that capacity, which he relinquished to

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accept his present position with Jack & Heintz, he was fully responsible for the production, engineering, sales, and coordination activities of the division.

* * *

J. G. MORAVEC HEADS PENN MOLINE BRANCH OFFICE

JAMES G. MORAVEC has been appointed manager of the Moline, Illinois, branch office for Penn Electric Switch Co. of Goshen, Indiana, to succeed Howard C. Shilling, resigned, according to R. H. Luscombe, sales manager.

JAMES G. MORAVEC

Moravec was released from active duty in July, 1947, with the rank of Lieut. Colonel after serving since Jan., 1942. Before being called to military service, Moravec was manager of the Moline branch for approximately 5 years. A graduate engineer, he has had a wide and varied experience in the application and sales of automatic controls for heating, refrigeration, engine, pump and air compressor equipment.

The Moline office of Penn Electric will remain in its present location at 535, 5th Ave. Bldg.

* * *

HEATING AND VENTILATING SHOW

DEVICES for promoting indoor comfort in an adverse climate will be represented at the forthcoming Heating & Ventilating Exposition in Grand Central Palace, New York, February 2-6, 1948. Many will be entirely new, and others strikingly improved according to the Exposition Management. With some 460 spaces already booked, applications are still being received for further assignments.

* * *

WEATHERHEAD APPOINTMENTS

WILLIAM L. HAUCK has been appointed Eastern District Sales Manager of The Weatherhead Company of Cleveland, Ohio, with headquarters at 4302 Lincoln Bldg., 60 East 42nd St., New York City, and A. F. Spring assumes the newly created position of Export Manager with

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X2 and X5 McQuay Zeropaks.
6 and 10 cubic foot Kold-Hold Standard Liners.
2 H.P. and 5 H.P. Delco motors, 3 phase, 1750 RPM. 220/440 volt.
All sizes of Hard Drawn Copper tubing.
REPUBLIC ELECTRIC COMPANY
Phone 2-6205 REFRIGERATION JOBBERS SINCE 1920 Davenport, Iowa

headquarters at the main plant, it was announced by H. Church, Vice President in Charge of Sales.

* * *

REFRIGERATION ENGINEERING EXPANDS SALES TO EASTERN MARKET

REFRIGERATION Engineering, Inc., Los Angeles, Calif., manufacturers and licencees of the water defrost coil, is expanding their distribution to the Eastern market. Simultaneously with this announcement, the company has licensed the Refrigeration Division of the Sterling Manufacturing Company of Omaha, Nebraska, to manufacture the water defrost coils in connection with the products in the field of transportation produced by this division of their company. Realizing that one of the problems in the operation of low temperature transport equipment is the frost factor, the company will incorporate the use of water defrost in their future manufacturing operations.

Sterling Smith, formerly General Sales Manager of Baker Ice Machine Company, has recently resigned his position with that firm and has opened offices under the name of Sterling Refrigeration Products, with headquarters in the Barr Building in Washington, D.C. The new organization headed by Smith will handle all the sales of all products manufactured by the Refrigeration Division of Sterling Manufacturing Company.

* * *

STANGARD REDUCES PRICES

THE Stangard-Dickerson Corp. of 46-76 Oliver St., Newark, N. J., manufacturers of prime surface patented cold plates, announces a reduction in the prices of their quality line of evaporator plates effective October 1, 1947.

Victor J. Moss, Director of Sales, reports that their steel supplies are now adequate, they have enlarged their manufacturing facilities, and are ready to take care of the requirements of the trade.

* * *

NEW CATALOGS AND BULLETINS

HASCO, INC., Greensboro, N. C., has issued a new price bulletin on parts and supplies carried in stock for immediate delivery. Their bulletin No. 947 included with the price sheets shows, in addition to

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new parts available from the company, rebuilt parts available on exchange.

KRAMER TRENTON CO., Trenton, N. J., has issued bulletin No. R-123 on the new Thermobank Curvette. Complete specifications on this forced circulation evaporator are included and application data on how it may be used with the Kramer Thermobank system. The evaporator is designed for low temperatures and small space applications and is particularly suitable to package type equipment.

AUTOMATIC PRODUCTS COMPANY, 2450 N. 32nd St., Milwaukee, Wis., have issued eight new catalog sections. They are: Section C, Form RS-111, Model 73-RJ solenoid; Section C, Form RS-121, Model 270 solenoid; Section D, Form WS-101, Model 71-J solenoid; Section D, Form WS-111, Model 71-J solenoid; Section F, Form M-110, Model 235-S suction pressure regulating valve; Section E, Form TD-120 and TD-110 on Trap-Dri; and Section B, Form E-131 on Model 207 thermostatic expansion valve.

THE HARRY ALTER CO., INC., wishes to announce that their new Fall and Winter Catalog, Harry Alter's Dependabook No. 145, has just been mailed. Among the many new items listed, it has listed for the first time genuine replacement Westinghouse electric motor parts, White Rodgers controls, a complete line of Triplett meters and testers, and the new Wabash Sep-Return, also all the latest price revisions. The front cover is a four color Fall scene, and the back cover pays tribute to many of the manufacturers in the refrigeration industry. If your copy hasn't reached you yet, write for it on your letterhead.

BROWN INSTRUMENT COMPANY of Philadelphia, a division of Minneapolis-Honeywell Regulator Co., has published a new catalog, "Air Operated Controllers," containing valuable information on instruments for the automatic control of industrial processes.

Incorporated in this catalog are complete and accurate descriptions of control instruments for temperature, pressure, flow, liquid level and humidity.

A copy of this 40-page catalog will be sent to anyone who requests it. Write to The Brown Instrument Co., Wayne & Roberts Aves., Philadelphia 44, Pa., for Catalog No. 8905.

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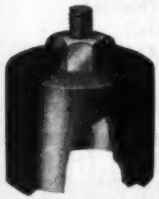

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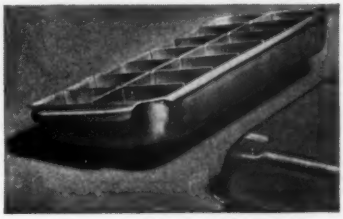

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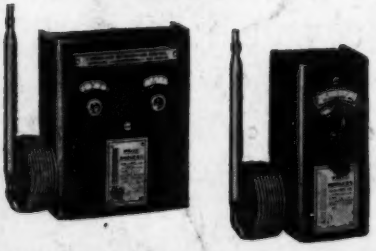

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